BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

April 26, 2002

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Finding of No Significant Impact for Wahiawa - Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii, TMK: 7-1-2: 4 and 18; 7-1-3; 7-1-4; and 7-1-10

The City and County of Honolulu Board of Water Supply (BWS) has reviewed the comments received during the 30-day public comment period which began on August 8, 2001. The BWS has determined that this project will not have significant environmental effects and has issued a Finding of No Significant Impact determination. Please publish this determination in the next edition of The Environmental Notice.

Four (4) copies of the Final Environmental Assessment and the Office of Environmental Quality Control Publication Form are enclosed. An electronic version of the project summary will be transmitted to you via e-mail by our consultant.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

CLIFFORD S. JAMILE
Manager and Chief Engineer

Enclosures

cc: Kay Muranaka, Engineering Concepts, Inc.

2002-05-08-OA-FEA-

FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

~

Wahiawa - Whitmore Village 16-inch Water Main Interconnection

Wahiawa, Oahu, Hawaii
TMK: 7-1-2:4 & 18; 7-1-3; 7-1-4; and 7-1-10

Proposing Agency:

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 South Beretania Street
Honolulu, Hawaii 96843

Prepared by:

ENGINEERING CONCEPTS, INC.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

MARCH 2002

FINAL ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT

~

Wahiawa - Whitmore Village
16-inch Water Main Interconnection
Wahiawa, Oahu, Hawaii
TMK: 7-1-2:4 & 18; 7-1-3; 7-1-4; and 7-1-10

This environmental document has been prepared pursuant to Chapter 343, Hawaii Revised Statutes

Proposing Agency:

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 South Beretania Street
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Prepared by:

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1150 South King Street, Suite 700
Honolulu, Hawaii 96814

MARCH 2002

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DEVELOPMENT SUMMARY

PROPOSING AGENCY:	Board of Water Supply City and County of Honolulu 630 South Beretania Street Honolulu, Hawaii 96843
Responsible Official:	Mr. Clifford S. Jamile Manager and Chief Engineer
Contact: Phone: Fax:	Mr. Scot Muraoka 527-5221 527-5703
PROJECT NAME:	Wahiawa-Whitmore Village 16-Inch Water Main Interconnection
PROPOSED ACTION:	Construction of a 16-inch diameter water main to provide a second interconnection between the municipal water systems serving the communities of Wahiawa and Whitmore Village
PROJECT LOCATION:	Central Oahu lands in Wahiawa, Whitmore Village and the Wahiawa Reservoir along the North Fork of Kaukonahua Stream
TAX MAP KEY:	7-1-2:4 & 18; 7-1-3; 7-1-4; and 7-4-10
LAND OWNER:	City and County of Honolulu (Kellog St., Kaala Ave., Clark St., Uwalu Circle, Circle Makai St., Nani Ihi Ave. State of Hawaii (Whitmore Avenue) Dole Food Company, Inc. (TMK: 7-1-2:4) Kenneth Komori Trust, Kae Komori Trust (TMK: 7-1-2:18)
PROJECT AREA:	<1 acre
STATE LAND USE DESIGNATION:	Urban (public roads) Agricultural (TMK: 7-1-2:4 & 18)
ZONING:	R-5 Residential AG-1 Restricted Agricultural P-2 General Preservation
EXISTING USE:	Public roads, undeveloped private lands and irrigation reservoir

CHAPTER 1
INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this Final Environmental Assessment (EA) is to disclose potential environmental impacts which may result from development of the proposed project, and to identify measures to mitigate these potential impacts. This document was prepared after public review of a Draft EA. Public comments and agency responses have been incorporated in this document.

1.2 BACKGROUND

The City and County of Honolulu Board of Water Supply (BWS) is proposing to construct a new 16-inch water main to provide a second interconnection between the existing water systems serving the communities of Wahiawa and Whitmore Village in central Oahu. Municipal wells and storage tanks serving the two communities are located in Wahiawa. Presently, water service to Whitmore Village is provided by a single transmission main, 12- and 16-inches in diameter, which crosses Wahiawa Reservoir to connect to the BWS 1180 water system in Wahiawa. The existing transmission main is over 50 years old. A major pipeline break along this alignment would completely sever water service to Whitmore Village, affecting both domestic consumption and fire protection. Construction of the proposed second interconnection between the two communities would improve water transmission to Whitmore Village by creating a looped distribution network. Additionally, the second interconnection provides reliability of service by ensuring continued water transmission to Whitmore Village in the event the existing aged transmission main becomes disabled.

1.3 OBJECTIVES

The objectives of the BWS are to manage and operate Oahu's municipal water system in a reliable and sound manner. To this end, the objectives of the proposed project are:

- to ensure reliable water service is provided to the community of Whitmore Village by strengthening the distribution network with Wahiawa; and
- to minimize impacts to the surrounding communities and environment which may result from construction and or operation of the proposed project.

1.4 PROJECT DESCRIPTION / LOCATION

The project site is located in Wahiawa and Whitmore Village in central Oahu (see **Figure 1-1**). Portions of the proposed water line will be constructed within the right-of-way of existing public roads, including: Kellog Street, Kaala Avenue, and Clark Street in Wahiawa; and Uwalu Circle, Circle Makai Street, Nani Ihi Avenue and Whitmore Avenue in Whitmore Village. The proposed alignment crosses Wahiawa Reservoir along the North Fork of Kaukonahua Stream, between Clark Street in Wahiawa and Uwalu Circle in Whitmore Village. The proposed reservoir

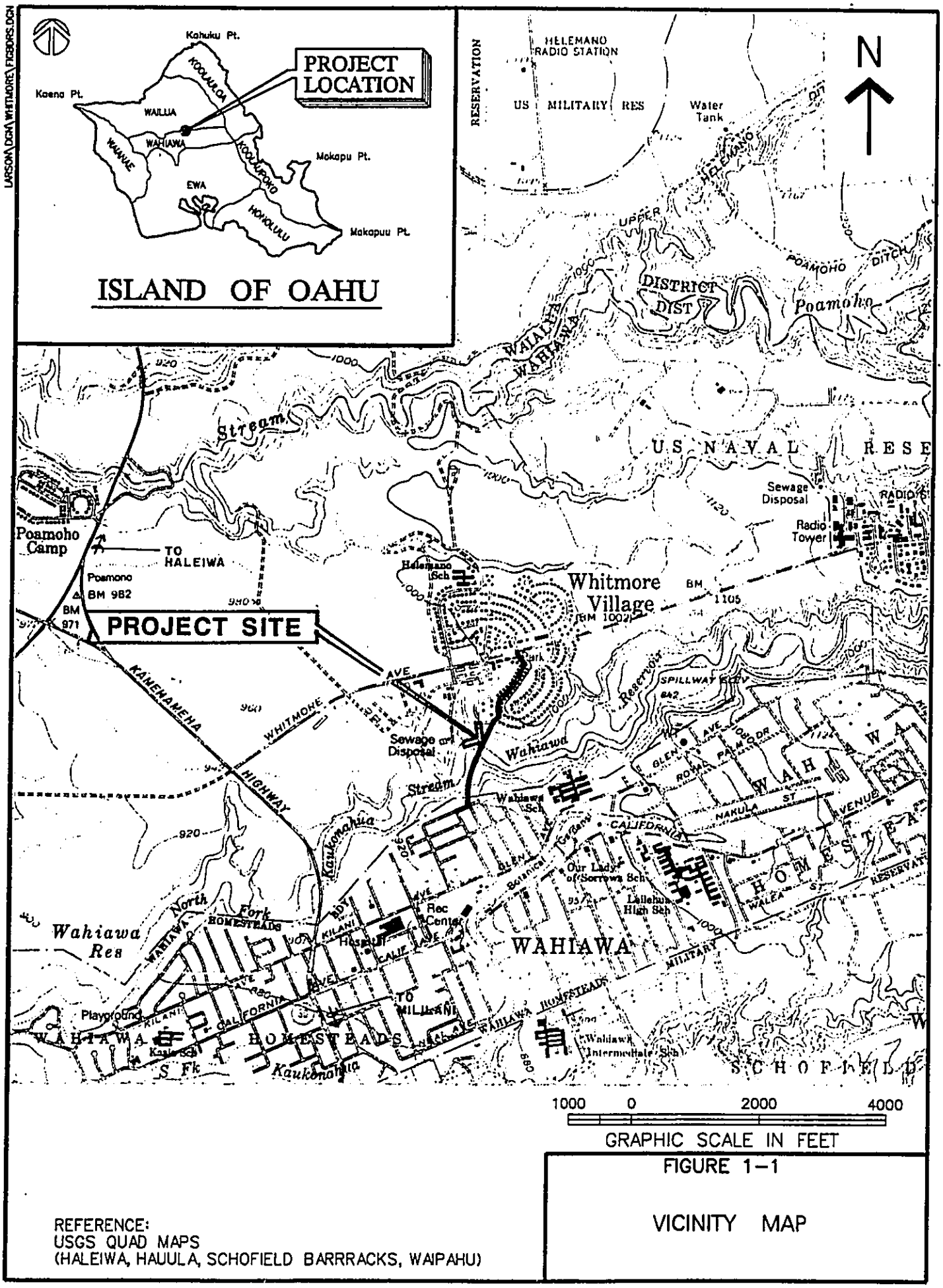

FIGURE 1–1

VICINITY MAP

REFERENCE:
USGS QUAD MAPS
(HALEIWA, HAUULA, SCHOFIELD BARRRACKS, WAIPAHU)

crossing affects lands owned by Dole Food Company, Inc. (TMK: 7-1-2:4), and the Kenneth Komori Trust and Kae Komori Trust (TMK: 7-1-2:18).

1.5 ALTERNATIVES CONSIDERED

In 1998, the BWS contracted Stanley Yim & Associates, Inc. to prepare a feasibility study addressing alternative alignments for the proposed interconnection. Subsequently, Engineering Concepts, Inc. was contracted to evaluate construction methods for the proposed interconnection alignment. This environmental assessment specifically addresses the recommended interconnection alignment and construction method. However, all of the alternatives which have been considered are presented in **Chapter 5.**

In addition to "no action", three alternative alignments were considered, one alternative construction method was evaluated, and rehabilitation of the existing pipe was assessed.

1.6 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

Regional Impacts

Short term regional impacts include increased traffic, dust and noise during construction. Mitigative measures are summarized in the sections that follow. The long term regional impact is improved water system reliability.

Topography

Impacts will be minimal since the water main will follow the existing topography. Slight variations will be associated with grading the service road.

Soil Erosion

Short term impacts will occur during construction due to removal of existing vegetation and trenching. Mitigative measures include implementation of control measures specified on the construction drawings, conducting clearing and grubbing in accordance with local ordinances, and timely re-establishment of vegetation. No long term impacts are anticipated.

Water Quality

The short term impact on water quality due to construction-related soil erosion would be minor compared to the natural erosion processes occurring in the area during storm events. Mitigative measures have been summarized above. No long term impacts are anticipated.

Flora

No long term impacts are anticipated. There were no threatened or endangered species or species of concern observed during the botanical survey.

Aquatic Flora and Fauna

No long term impacts are anticipated. There were no threatened or endangered species observed during the aquatic biota survey.

Archaeological and Historic Resources

The project is not anticipated to impact archaeological and historic resources. Archaeological monitoring is not warranted during construction. However, work will be halted and direction will be requested from the State Historic Preservation Division and the Oahu Island Burial Council if inadvertent discoveries are made during construction.

Cultural Impacts

The project is not anticipated to impact cultural resources.

Land Use and Zoning

No land use change is needed. The water main is a principal use in all zoning districts.

Land Ownership and Neighboring Lands

Easements will be required from two private landowners, which may be viewed as a negative impact if there are conflicting plans for the properties. These landowners and neighboring landowners along the affected public roads will be inconvenienced by increased traffic, dust and noise during construction.

Traffic

Traffic impacts will be limited to the construction period and may include: temporary lane closures, detours with limited access for local traffic only, increased traffic congestion and on-street parking congestion. These impacts will be mitigated by implementing an approved traffic control plan and scheduling construction to avoid peak traffic conditions. No long term impacts are anticipated.

Air Quality

Short term impacts to air quality include generation of fugitive dust and exhaust emissions during construction. The contractor will be required to implement an effective dust control plan and minimize vehicle exhaust emissions in compliance with the state Department of Health regulations. No long term impacts are anticipated.

Noise

The contractor will be required to comply with state Department of Health regulations to minimize the short term noise impacts associated with construction. A Community Noise Permit for Construction Activities will be obtained. No long term impacts are anticipated.

Utilities

Impacts to nearby existing utilities will be minimized by coordination during planning, design and construction. The contractor will ultimately be responsible to locate and protect existing utilities; and repair any damage which may result to existing utilities due to the project construction.

1.7 PERMITS AND APPROVALS REQUIRED

Permits and approvals which may be required for construction of the proposed project are listed in **Table 1-1**. The applicability of these environmental permits will be coordinated with the respective agencies, and permit applications will be prepared as planning and design of the project proceeds.

The project site is not located in the Special Management Area or Conservation District. Further, the area of disturbance will not exceed five acres and is therefore not subject to a National Pollutant Discharge Elimination System (NPDES) permit for discharge of storm water associated with construction activity. Correspondence with the U.S. Coast Guard (included in **Appendix A**) states that Kaukonahua Stream is not considered to be a navigable waterway and that a Coast Guard permit would not be required.

TABLE 1-1
PERMITS AND APPROVALS

AGENCY	PERMIT / APPROVAL
U.S. Department of the Army Corps of Engineers	• Section 404 Permit
State of Hawaii Office of Planning	• Coastal Zone Management Consistency Certification
State of Hawaii Department of Health	• Section 401 Water Quality Certification • NPDES General Permit Coverage Authorizing Discharges of Hydrotesting Waters • Community Noise Permit for Construction Activities • Variance from Pollution Controls
State of Hawaii *Commission on Water Resource Mgmt.*	• Stream Channel Alteration Permit
State of Hawaii Department of Transportation	• Street Usage Permit • Construction Plan Approval
City and County of Honolulu Department of Design and Construction	• Construction Plan Approval
City and County of Honolulu Department of Environmental Services	• Permit to Discharge Effluent to the Municipal Storm Sewer System • Construction Plan Approval
City and County of Honolulu Department of Planning and Permitting	• Grubbing, Grading and Stockpiling Permit • Sign Permit • Permit to Excavate Public Right-of-Way • Construction Plan Approval • Traffic Control Plan Approval • Subdivision Application to Create Easements
City and County of Honolulu Department of Transportation Services	• Street Usage Permit

CHAPTER 2
PROJECT DESCRIPTION

2.1 NEED FOR THE PROJECT

Presently, municipal water service to the community of Whitmore Village is provided by a single water main from Wahiawa that is over 50 years old. A major pipeline break along the water main alignment would completely sever water service to Whitmore Village, affecting both domestic consumption and fire protection. The proposed action would improve reliability by providing a second interconnection main between the two communities to ensure continued water service to Whitmore Village in the event the existing water main becomes disabled. Construction of a second interconnection main would also improve water transmission to Whitmore Village by creating a looped distribution network.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The Wahiawa end of the proposed water main would connect to an existing 12-inch main in Kellogg Street at the intersection with Kaala Avenue. From there, the proposed alignment would be located along Kaala Avenue and turn north at the Clark Street intersection. The proposed alignment crosses a steep gulch between the end of Clark Street in Wahiawa and Uwalu Circle in Whitmore Village. The gulch is part of the Wahiawa Reservoir, formed by the North Fork of Kaukonahua Stream. From Uwalu Circle, the proposed alignment would be located along Circle Makai Street and turn north along Nani Ihi Avenue to Whitmore Avenue. The proposed water main would terminate in Whitmore Village by connecting to an existing 12-inch water main in Whitmore Avenue. The proposed water main alignment is illustrated on **Figure 2-1.**

2.2.1 Construction within Public Road Rights-of-Way

Kellog Street, Kaala Avenue, Clark Street, Uwalu Circle, Circle Makai Street and Nani Ihi Avenue are public roads under the jurisdiction of the City and County of Honolulu. Construction of the proposed water main within the rights-of-way of these roads would be subject to maintaining required clearances from existing utility lines. Excavation of a 30-inch wide trench would be required to lay the pipe. The minimum excavated depth would be about five feet in order to maintain at least three feet of cover over the pipe. Approved pipe materials include ductile iron, concrete cylinder, and polyvinyl chloride (PVC). No dewatering is anticipated for trenching within the road rights-of-way.

2.2.2 Construction within Private Lands

A portion of the proposed action is located within privately-owned lands. These private lands are located along both sides of the reservoir, within the gulch area between Clark Street and Uwalu Circle. Refer to **Figure 2-2** for land ownership information along the proposed water line alignment. A plan and profile view of the proposed water main alignment between Clark Street and Uwalu Circle is presented on **Figure 2-3.**

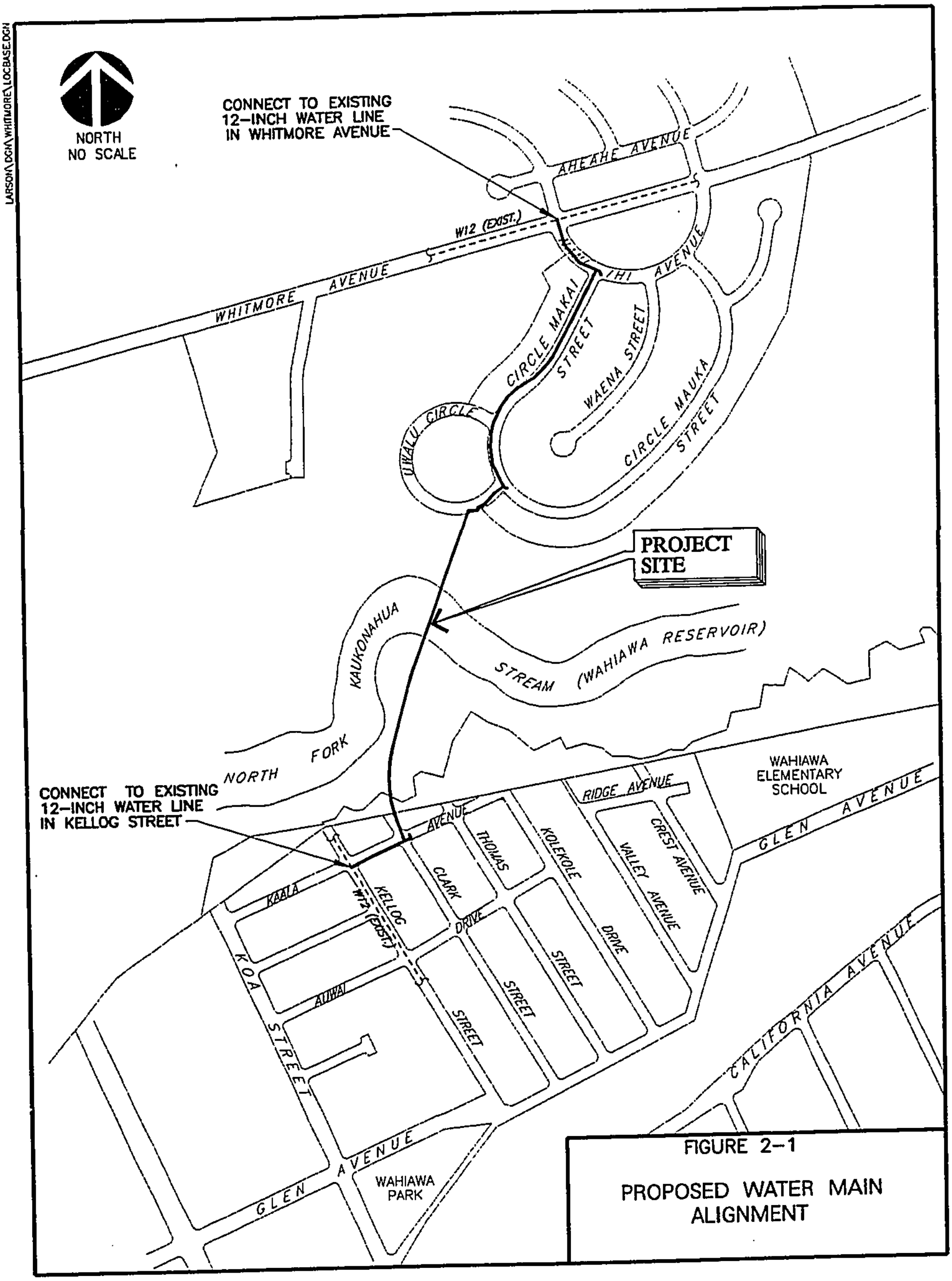

FIGURE 2-1

PROPOSED WATER MAIN ALIGNMENT

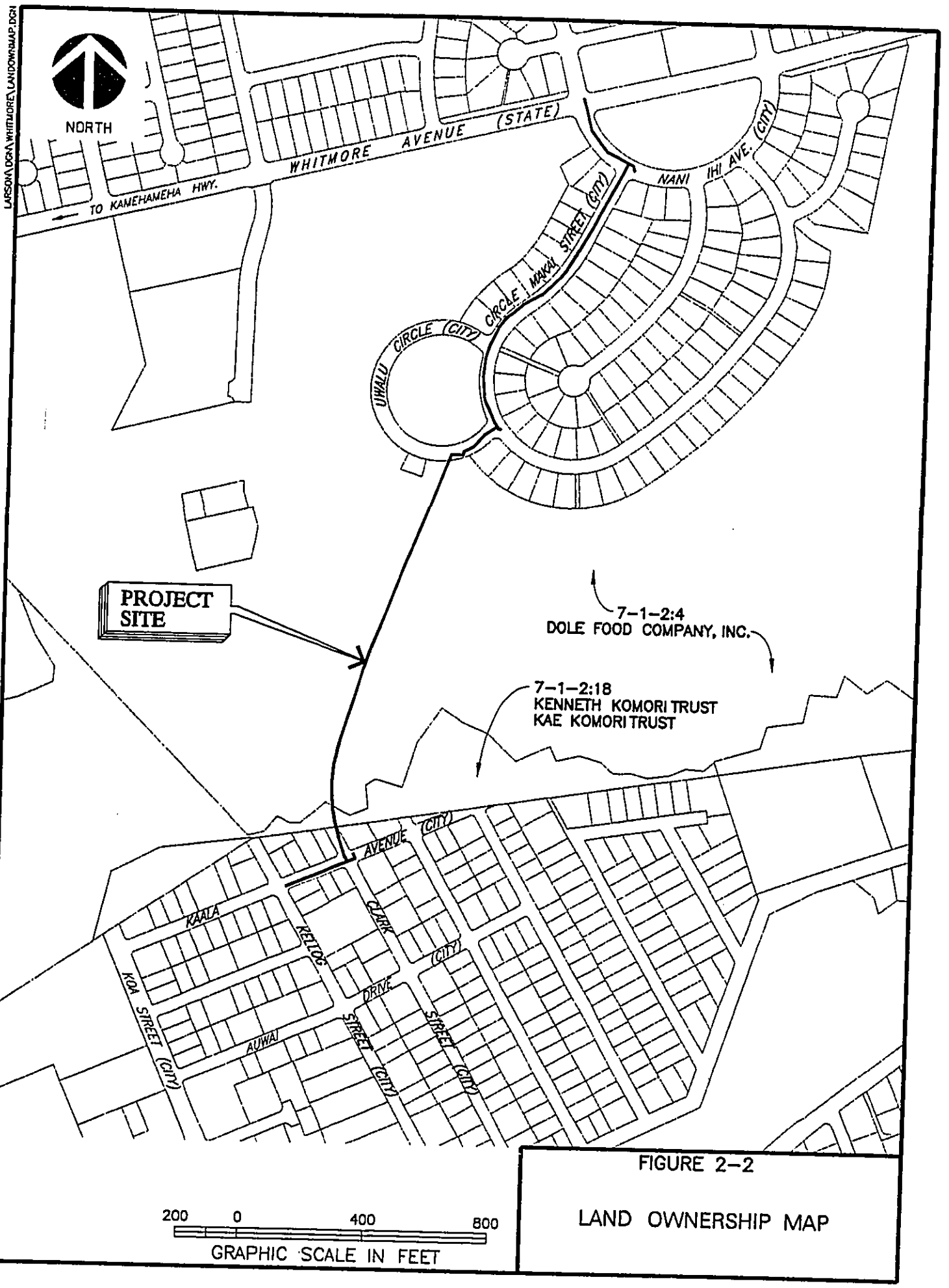

FIGURE 2-2

LAND OWNERSHIP MAP

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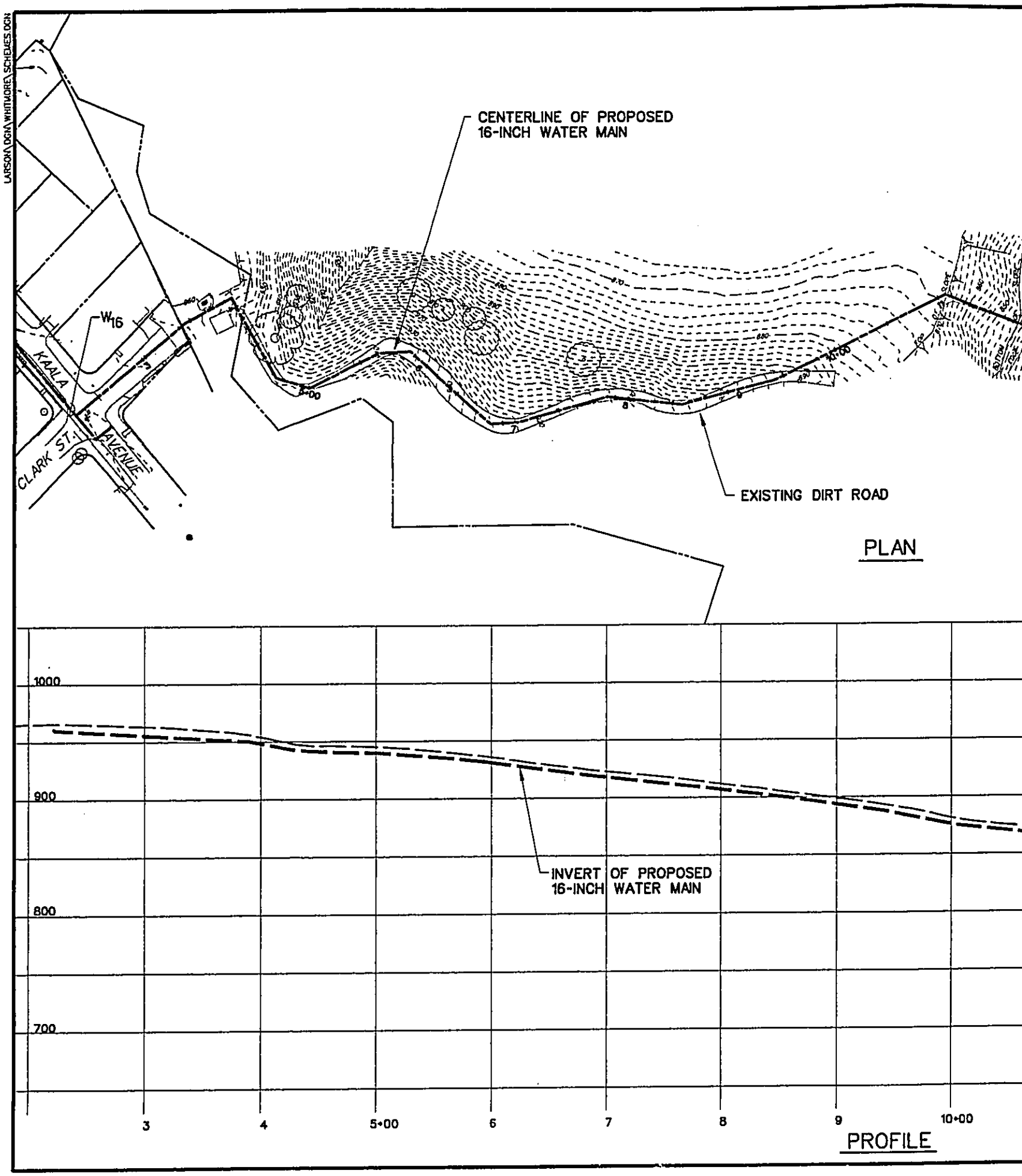


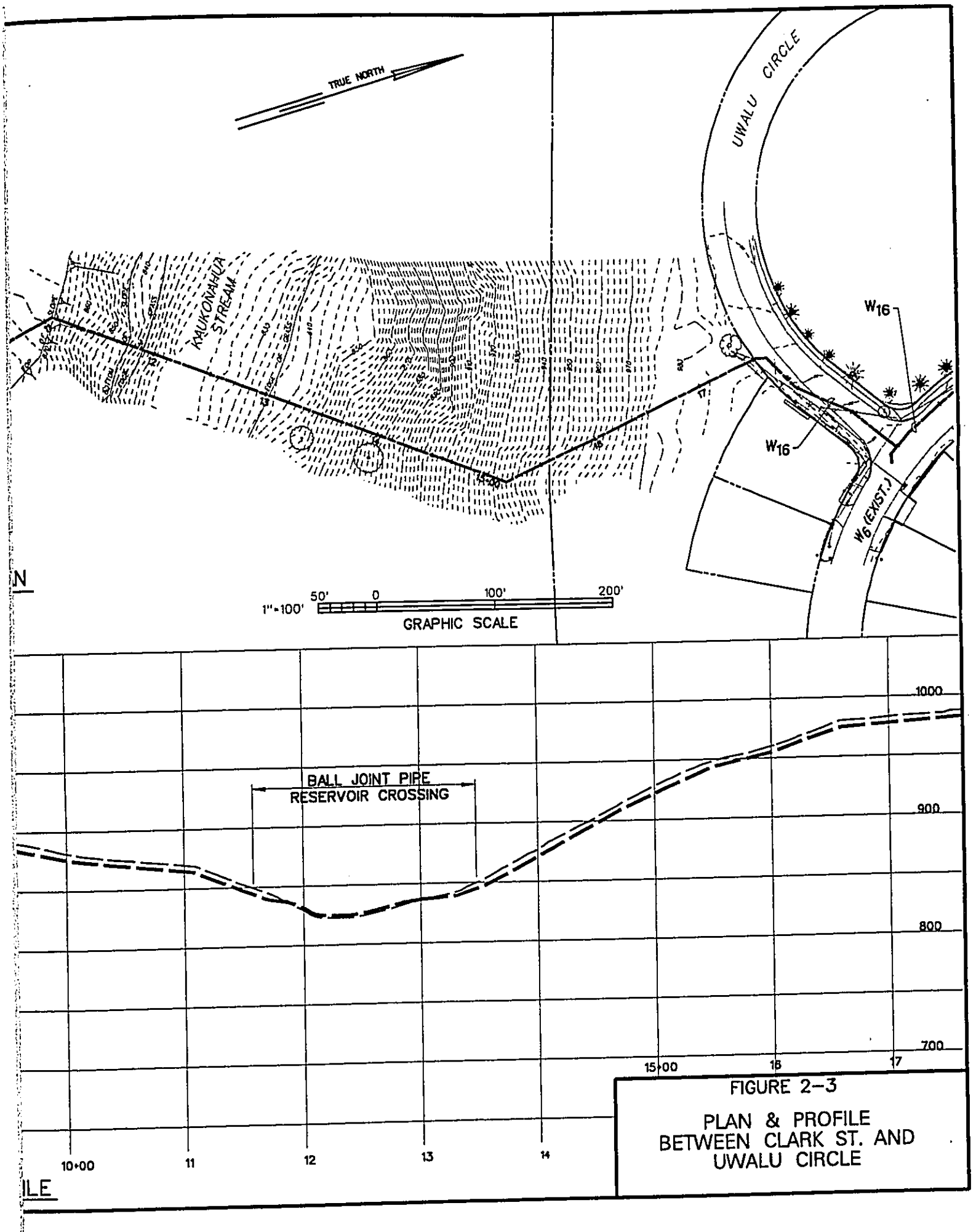


FIGURE 2-3

PLAN & PROFILE
BETWEEN CLARK ST. AND
UWALU CIRCLE

A 20-foot wide pipeline easement would be required for the portion of the proposed 16-inch water main that will be located within privately-owned lands. In addition, the BWS requires construction of an all-weather service road within the pipeline easement for maintenance of the water line. For this project, construction of a 10-foot wide paved road is proposed, following the alignment of an old dirt road on the Wahiawa side of the gulch. Construction of a service road would be difficult in some areas on the Whitmore Village side due to the steep gulch slope. Therefore, the pipeline will be jacketed in concrete for protection where it is inaccessible for maintenance (ground slope in excess of 20 percent). The jacketed portion of the pipeline would be constructed of ductile iron pipe.

The affected land owners and the approximate land requirement for the pipeline easement are listed in **Table 2-1**.

TABLE 2-1
PIPELINE EASEMENT REQUIREMENTS

TMK Parcel*	Land Owner	Easement Length (feet)*	Easement Area (sq. ft.)*
7-1-2:18	Kenneth Komori Trust Kae Komori Trust	50	1,000
7-1-2:4	Dole Food Co., Inc.	1,362	27,240

*approximate values

2.2.3 Reservoir Crossing

Approximately 190 feet of water main will be laid across the reservoir or in trenches adjacent to the reservoir that will be subject to groundwater intrusion. Use of ductile iron ball joint pipe is proposed for these portions of pipeline. Ball joint pipe provides a strong, flexible joint without use of bolts that is well suited for underwater installations. Use of ball joint pipe would also allow the water main to rest on the stream bottom, eliminating the need to trench within the stream. Use of ball joint pipe in the trenches on both stream banks enables laying the pipe in wet conditions, eliminating the need to dewater the trenches. The proposed use of ball joint pipe for this project is detailed in **Figure 2-4**.

2.3 PROJECT SCHEDULE AND CONSTRUCTION COST

The project is scheduled for construction in late 2002. The actual start date will be dependent on obtaining the required permits and approvals. It is anticipated that construction will take 16 months to complete, including approximately five months to construct the reservoir crossing. The estimated construction cost for the project is $1.3 million, to be funded by the BWS.

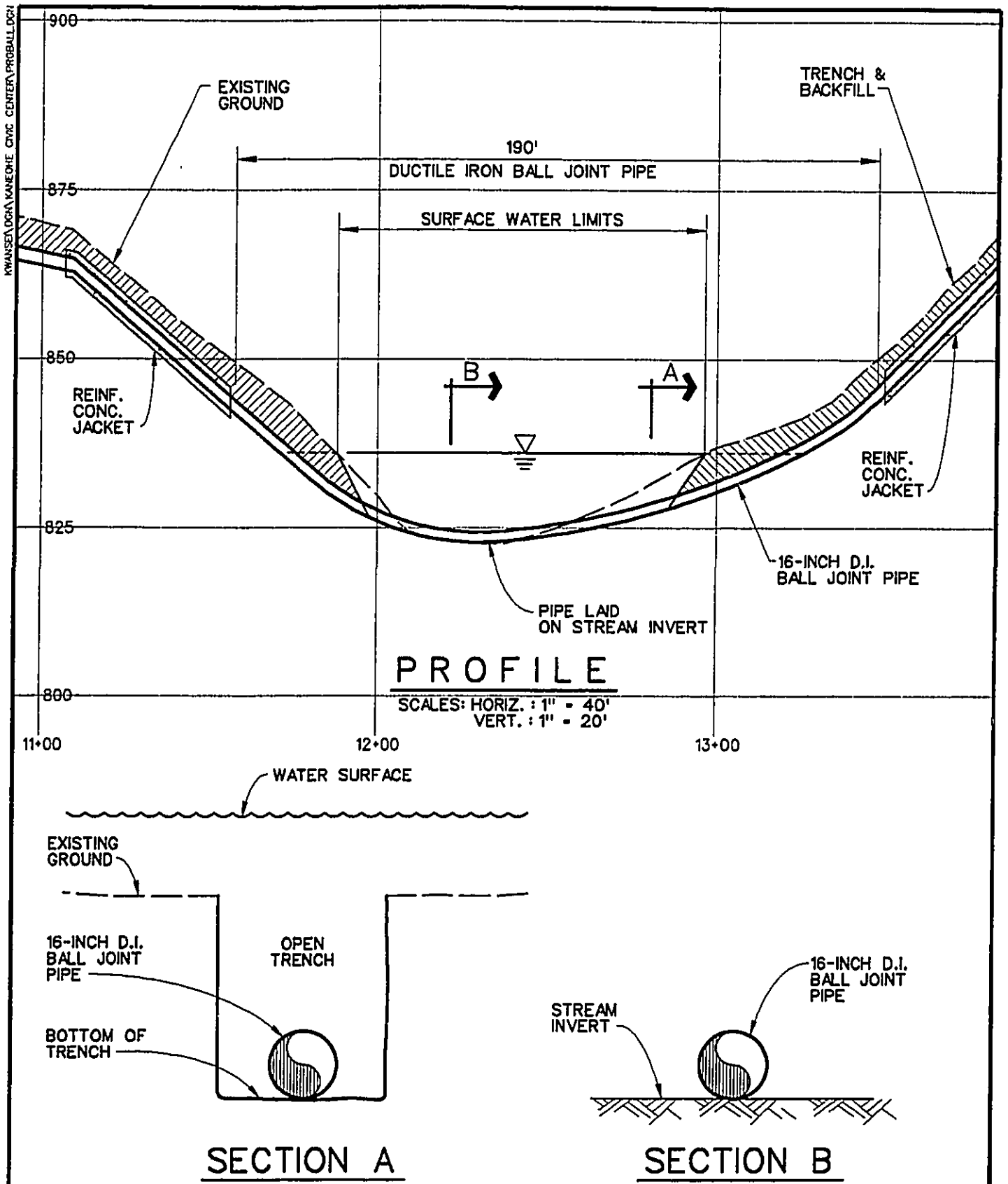


FIGURE 2-4

PROFILE AND SECTIONS AT PROPOSED RESERVOIR CROSSING

CHAPTER 3
DESCRIPTION OF THE AFFECTED ENVIRONMENT

The intent of this chapter is to describe the existing physical and social environment which is affected by the proposed action. Potential impacts which may result from development of the proposed action, and mitigation measures which will be employed to minimize negative impacts, are described in **Chapter 4.**

3.1 TOPOGRAPHY

Ground elevations range from 958 feet at the intersection of Kaala Avenue and Kellog Street in Wahiawa, to approximately 822 feet at the invert of the Wahiawa Reservoir crossing along the North Fork of Kaukonahua Stream, to 1009 feet at Whitmore Avenue in Whitmore Village.

Steep slopes in the gulch area range from 1.5 horizontal to 1 vertical (1.5:1), to 2:1. The old dirt road on the Wahiawa side of the gulch has a maximum slope of about 14 percent.

3.2 SOILS

According to the *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai*, the soils in the project area are classified as Leilehua silty clay, 2 to 6 percent slopes (LeB); and Helemano silty clay, 30 to 90 percent slopes (HLMG). The LeB soil type is prevalent along the two ends of the proposed water main alignment in the relatively flat residential areas of Wahiawa and Whitmore Village. The HLMG soil type is located in the steeply sloping gulch area on both sides of the reservoir.

The Leilehua series consists of well-drained upland soils, developed in material weathered from basic igneous rock. Conditions may be gently sloping to moderately sloping, with elevations ranging from 900 to 1,200 feet. The LeB soil type in particular occurs in both broad and narrow areas bordered by gulches. Permeability is moderately rapid, runoff is slow, and the erosion hazard is slight.

In contrast, the Helemano series consists of well-drained soils on the sides of gulches developed in alluvium and colluvium derived from basic igneous rock. Conditions may be steep to extremely steep, with elevations ranging from 500 to 1,200 feet. The HLMG soil type is found on the sides of V-shaped gulches. Soil characteristics include moderately rapid permeability, medium to very rapid runoff potential, and severe to very severe erosion hazard.

3.3 WAHIAWA RESERVOIR / KAUKONAHUA STREAM

Kaukonahua Stream was dammed in 1906 at the confluence of its north and south forks to provide irrigation water for the Waialua Agricultural Company, later known as the Waialua Sugar Company. The dam spillway is located at the 842-foot elevation. Wahiawa Reservoir, also known as Lake Wilson, has a capacity of 2.5 billion gallons and extends approximately seven miles along the natural stream beds and canyons in Kaukonahua gulch. Treated

wastewater effluent from the City and County of Honolulu's Wahiawa Wastewater Treatment Plant has been discharged to the south branch of the reservoir since 1928. Approximately 300 acres of Wahiawa Reservoir is designated as the Wahiawa Public Fishing Area. Access is generally via Wahiawa State Freshwater Park along the south fork of the reservoir.

The proposed water main crossing is located approximately 1.7 miles upstream of the dam and 0.9 mile downstream from where the North Fork of Kaukonahua Stream enters Wahiawa Reservoir. The project site is located on a broad curve of the gulch, resulting in a much steeper bank on the outside, eroding face (Whitmore Village side) than on the inside face of the bend (Wahiawa side). The reservoir width varies from 120 to 150 feet in the vicinity of the proposed crossing. However, California grass extends as a floating mat generally obscuring the actual shoreline, and giving the appearance of a much narrower width (about 80 feet). Water depth at the proposed crossing is dependent upon the reservoir level, approximately 18 to 19 feet in the middle of the channel.

Water quality measurements were taken at two locations in the vicinity of the project site for comparison with the extensive water quality data already available for Wahiawa Reservoir. The analysis results of the two surface water samples are summarized in **Table 3-1**. Both samples represent reservoir surface water samples that are moving slowly and are probably well mixed horizontally within the sampling area. Although representative of a small part of the reservoir and conditions at a single point in time, the analysis results are consistent with the known reservoir water quality which is based, in some cases, on long term monitoring efforts.

3.4 FLOOD HAZARD

According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, the project site is located within Zone D, an area in which flood hazards are undetermined (see **Figure 3-1**).

3.5 FLORA

A botanical resources assessment was conducted by Char & Associates. Field work, conducted in May 2000, encompassed the undeveloped portion of the project site extending from the end of Clark Street in Wahiawa to Uwalu Circle in Whitmore Village. North of Clark Street, the proposed water main alignment follows an existing overgrown dirt road within a mixed introduced forest. Large *Eucalyptus* spp. (30 to 50 feet tall) are abundant. Ground cover is sparse where the tree canopy is dense, with scattered patches of shade-tolerant plants in more open areas. The proposed alignment then crosses an open, grassy area with scattered shrubs and trees. Hilo grass (*Paspalum conjugatum*) with scattered clumps of Guinea grass (*Panicum maximum*) account for 50 to 60 percent of the cover. Along the reservoir, the shrub-covered banks drop off sharply into deep water. The proposed water main alignment does not cross any wetland areas.

Steep slopes are also present on the Whitmore Village side of the reservoir. On the slopes above the stream, the proposed alignment crosses open, grassy areas interspersed with patches of mixed scrub forest (six to 40 feet in height). Near Uwalu Circle, the proposed alignment crosses an existing community garden.

TABLE 3-1
SURFACE WATER QUALITY CHARACTERISTICS

Constituent	Station 1	Station 2
Time	11:35 am	12:25 pm
Temperature (°C)	27.2	27.2
pH	7.45	7.55
Dissolved Oxygen (mg/l)	8.1	7.9
DO Saturation (%)	102	99
Conductivity (µmhos)	78.6	78.2
Turbidity (NTU)	14.2	11.7
Total Suspended Solids (mg/l)	11.1	12.8
Ammonia (µgN/l)	31	10
Nitrate + Nitrite (µgN/l)	1	<1
Total Nitrogen (µgN/l)	560	466
Total Phosphorus (µgP/l)	37	28

Reference: AECOS, Inc.

Notes:
(1) Water samples were collected along the north branch of Wahiawa Reservoir below Whitmore Village on July 3, 2000.

(2) Station 1 is located on the north bank (Whitmore Village side), about 200 feet east of the proposed crossing. Water sample was collected among grass plants at the shoreline.

(3) Station 2 is located on north bank, about 800 feet west of the proposed crossing. Water sample was collected and in-situ probes were placed at the edge of open water, about 12 to 15 feet across the floating grass mat.

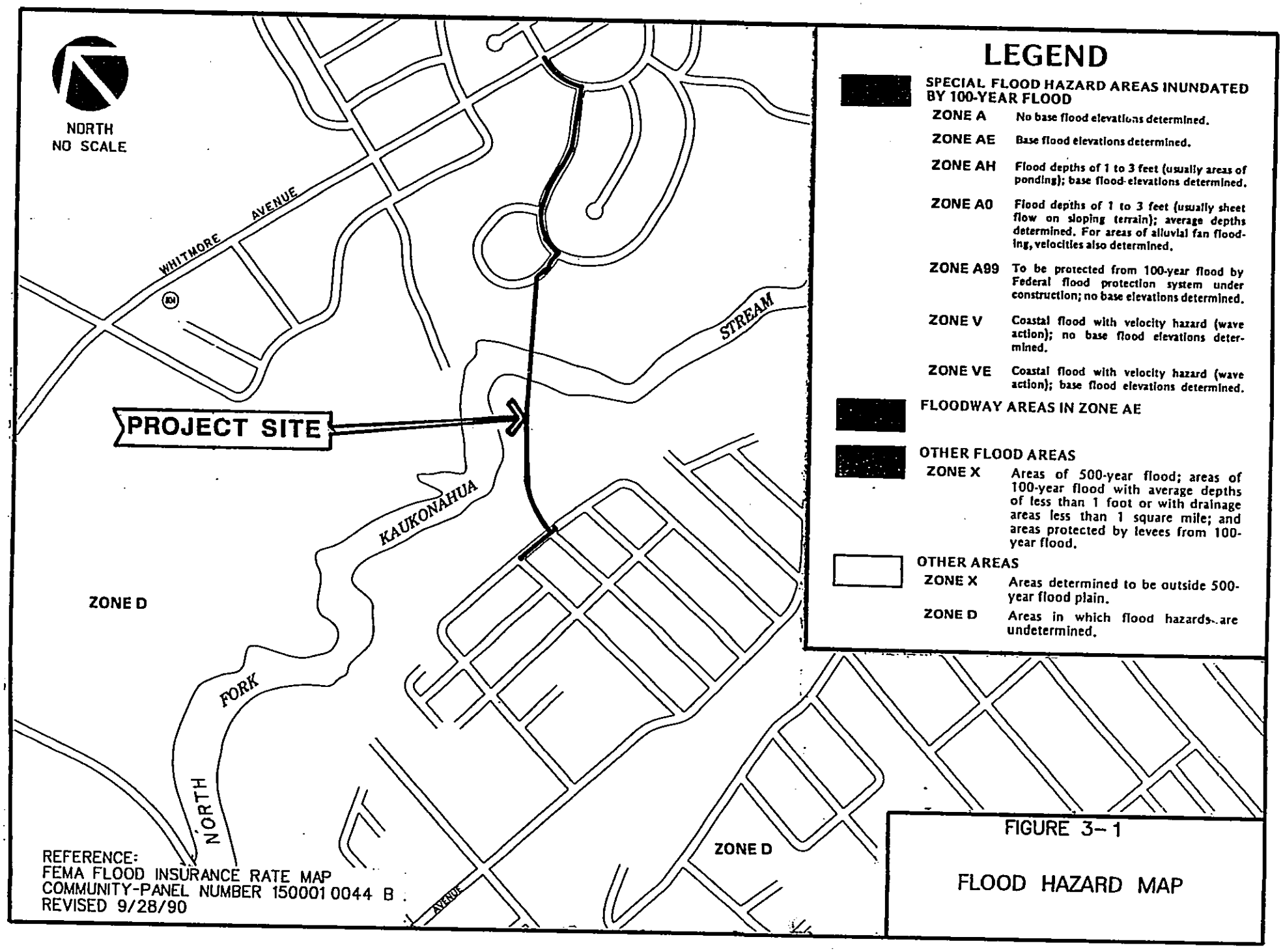


FIGURE 3-1

FLOOD HAZARD MAP

Vegetation along the proposed water main alignment is dominated by introduced plants such as Java plum (*Syzygium cumini*), eucalyptus, strawberry guava (*Psidium cattleianum*), Hilo grass and molasses grass (*Melinus minutiflora*). Of the native species found along the proposed alignment, only one, the kilau fern (*Pteridium aquilinum* var. *decompositum*) is endemic (native only to the Hawaiian Islands). Five other native species noted during the survey are indigenous (native to Hawaii and elsewhere). These species are the 'ulei (*Osteomeles anthyllidifolia*), 'uhaloa (*Waltheria indica*), ricegrass (*Paspalum scrobiculatum*), manienie 'ula or golden crownbeard (*Chrysopogon aciculatus*), and uluhe fern (*Dicranopteris linearis*).

Refer to **Appendix C** for the complete botanical resources assessment report.

3.6 AQUATIC FLORA AND FAUNA

An aquatic resources survey way conducted by AECOS, Inc. in July 2000. Refer to **Appendix D** for the complete report.

The Department of Land and Natural Resources began stocking the reservoir with sport fish in the late 1950's, including tilapia, tucanare, largemouth and small mouth bass, bluegill, channel catfish, oscar, pongee, puntat, and carp. Other species have also become established in the reservoir due to purposeful or accidental release. In the 1970's it was estimated that Wahiawa Reservoir supported 400 tons of fish, including at least 300 tons of tilapia. A list of fishes established in the reservoir is presented in **Table 3-2**.

The only aquatic organisms observed during the field survey were the non-native damselfly, *Ischnura posita*, and a small pond snail. Smaller species of fish and juveniles of the larger species were expected but not evident along the partially submerged vegetation along the reservoir banks. All of the fish species established in the reservoir can be expected within the project area, as well as various invertebrate species, such as aquatic insects, snails and small crustaceans.

No aquatic birds were observed during the field survey. Wahiawa Reservoir was not included in an inventory of state wetlands of importance to water birds, nor was it considered as a wetland of marginal value to water birds. Although conditions are not very good for feeding from the banks, the indigenous black-crowned night heron (*Nycticorax nycticorax hoactli*), a wetland species commonly found around streams, ponds and lakes on Oahu, might well be observed on occasion in the area.

3.7 ARCHAEOLOGICAL AND HISTORIC RESOURCES

An archaeological assessment of the proposed water main route was prepared by Cultural Surveys Hawaii, Inc. Their report included historical research to determine if archaeological sites have been recorded on or near the project site and a field investigation to identify surface archaeological features. Refer to **Appendix E** for the complete report.

Historic documentation suggests that Wahiawa was highly significant in traditional Hawaiian times. A large Hawaiian village continued to exist at least up to the mid-19th century. However, toward the end of the 19th century, western entrepreneurial, agricultural and military

TABLE 3-2
FISH SPECIES ESTABLISHED IN WAHIAWA RESERVOIR AS OF 1988

Scientific Name	Common Name	Abundance	Introduction (Year and Type)
Tilapia mossambica	Tilapia	Extremely abundant	1952 - deliberate
Dorosoma petenense	Threadfin shad	Extremely abundant	1959 - deliberate
Tilapia melanotheron	Tilapia	Very abundant	1976 - accidental
Pterygoplichthys multiradiatus	Armored catfish	Very abundant	1986 - accidental
Chichla ocellaris	Tucunare	Abundant	1964 - deliberate
Micropterus salmoides	Largemouth bass	Abundant	1908 - deliberate
Ophicephalus striatus	Pongee snakehead	Abundant	1904* - deliberate
Xenentodon cancila	Stickfish	Abundant	1988 - accidental
Ictalurus punctatus	Channel catfish	Abundant	1959 - deliberate
Gambusia affinis	Mosquito fish	Abundant	1905 - deliberate
Tilapia macrochir	Tilapia	Common	1957 - deliberate
Micropterus dolomieu	Smallmouth bass	Common	1956 - deliberate
Clarias fuscus	Puntat chinese catfish	Common	1904* - deliberate
Cyprinus carpio	Koi carp	Common	1904* - deliberate
Lepomis macrochirus	Bluegill	Common	1946 - deliberate
Awaous stamineus	O'opu	Common	Native species
Carassius auratus	Goldfish	Unusual	1904* - accidental
Astronotus ocellatus	Oscar	Unusual	1958 - deliberate
Xiphophorus helleri	Swordtail	Unusual	1968 - accidental
Misgurnus anguilicaudatus	Dojo	Unusual	1904* - deliberate
Pterophyllum sp.	Angelfish	Rare	1982 - accidental
Colossoma macropomum	Pacu	Rare	1987 - accidental

Reference: AECOS, Inc.

*Estimated date

interests focused on the area, having direct impacts upon all portions of the proposed water line route.

A field investigation was conducted in May 2000. No surface archaeological sites were observed on any portion of the proposed water main alignment. Both ends of the proposed alignment will be constructed within asphalt-paved roads through residential areas. The gulch slopes down to the reservoir are steep and have been heavily impacted by human intrusion, as evidenced by modern trash. No evidence of traditional Hawaiian activity was observed on the grassy bank of the reservoir. It is likely that the rising waters of the reservoir would have destroyed any traditional Hawaiian terracing or features associated with the former free-flowing stream.

Cultural Surveys Hawaii, Inc. concluded that there is little likelihood of encountering prehistoric or significant post-contact surface structures or subsurface archaeological remains during construction of the proposed water main. Their conclusion was based on the history of modern development along the proposed alignment; the general absence of findings in the adjacent archaeological study area; and the results of the field inspection.

3.8 LAND USE AND ZONING

The project site is located in the Urban and Agricultural districts according to the State Land Use District Boundary Maps for the area (see **Figure 3-2**). Both ends of the proposed water main alignment are located in the Urban district. The central portion of the project site, located within the undeveloped gulch, is located within the Agricultural district.

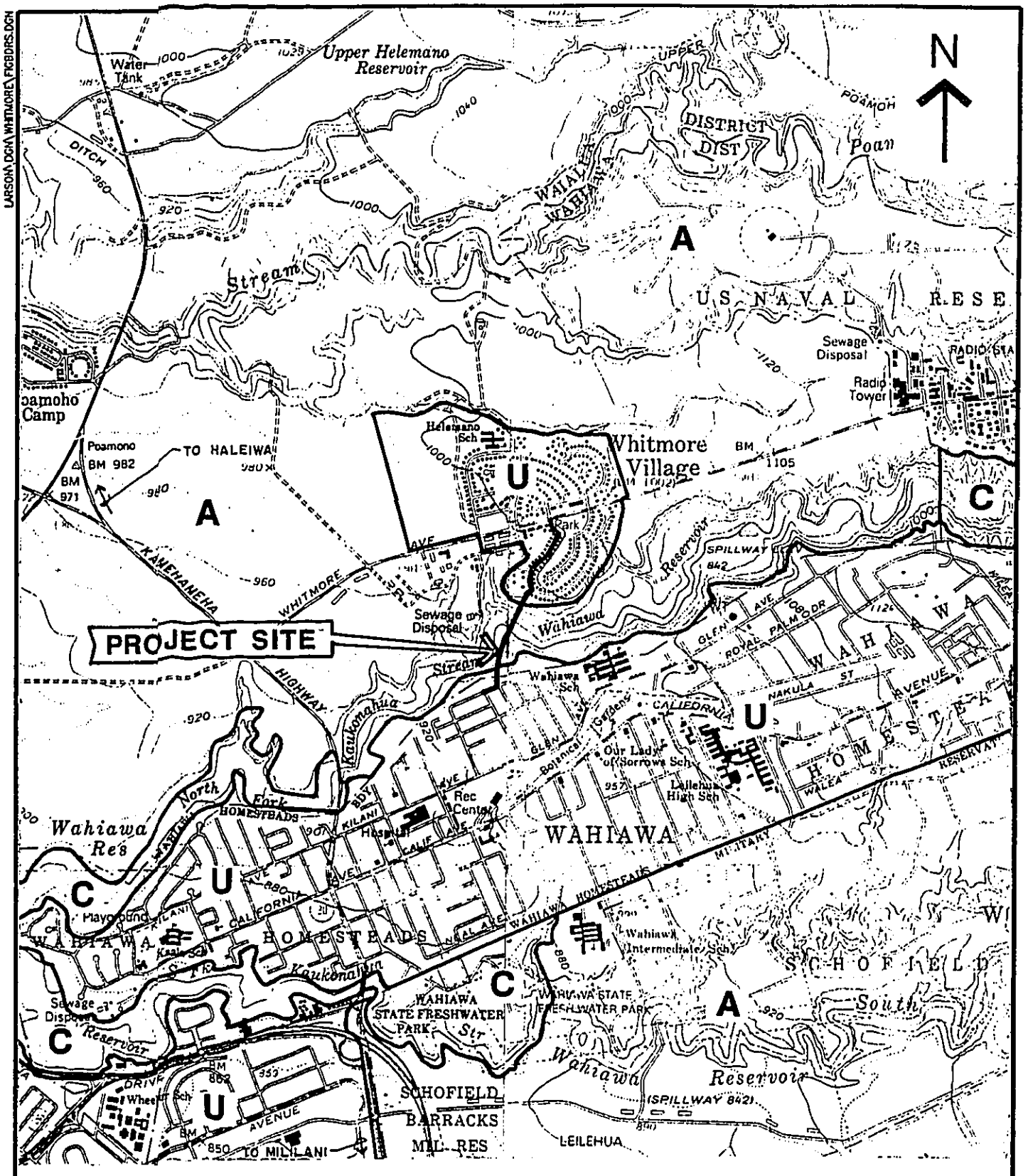
According to the City and County of Honolulu Zoning Map for the area (see **Figure 3-3**), the project site is located in lands zoned Residential (R-5), Restricted Agricultural (AG-1), and General Preservation (P-2).

3.9 LAND OWNERSHIP AND NEIGHBORING LANDS

The proposed water main alignment is located within both public and private lands. The public lands are road rights-of-ways within primarily residential areas of Wahiawa and Whitmore Village. Therefore, neighboring lands consist primarily of homes along the affected streets (Kellog Street, Kaala Avenue, Clark Street, Uwalu Circle, Circle Makai Street, Nani Ihi Avenue and Whitmore Avenue). Other neighboring lands include Whitmore Community Park and businesses on the corner of Whitmore Avenue and Ehoeho Street.

Whitmore Avenue is a main thoroughfare, providing access to Kamehameha Highway from the community of Whitmore Village and the Naval Computer and Telecommunications Area Master Station, Pacific (NCTAMS PAC). The two-lane road has a posted speed limit of 35 mph and is maintained by the state Department of Transportation.

Private lands that will be directly affected by the proposed alignment are owned by Dole Food Company, Inc., Kenneth Komori Trust, and Kae Komori Trust. These lands were identified in **Table 2-1** and **Figure 2-2**.



LEGEND:

——— STATE LAND USE DISTRICT BOUNDARY

A AGRICULTURAL DISTRICT

C CONSERVATION DISTRICT

U URBAN DISTRICT

REFERENCE:

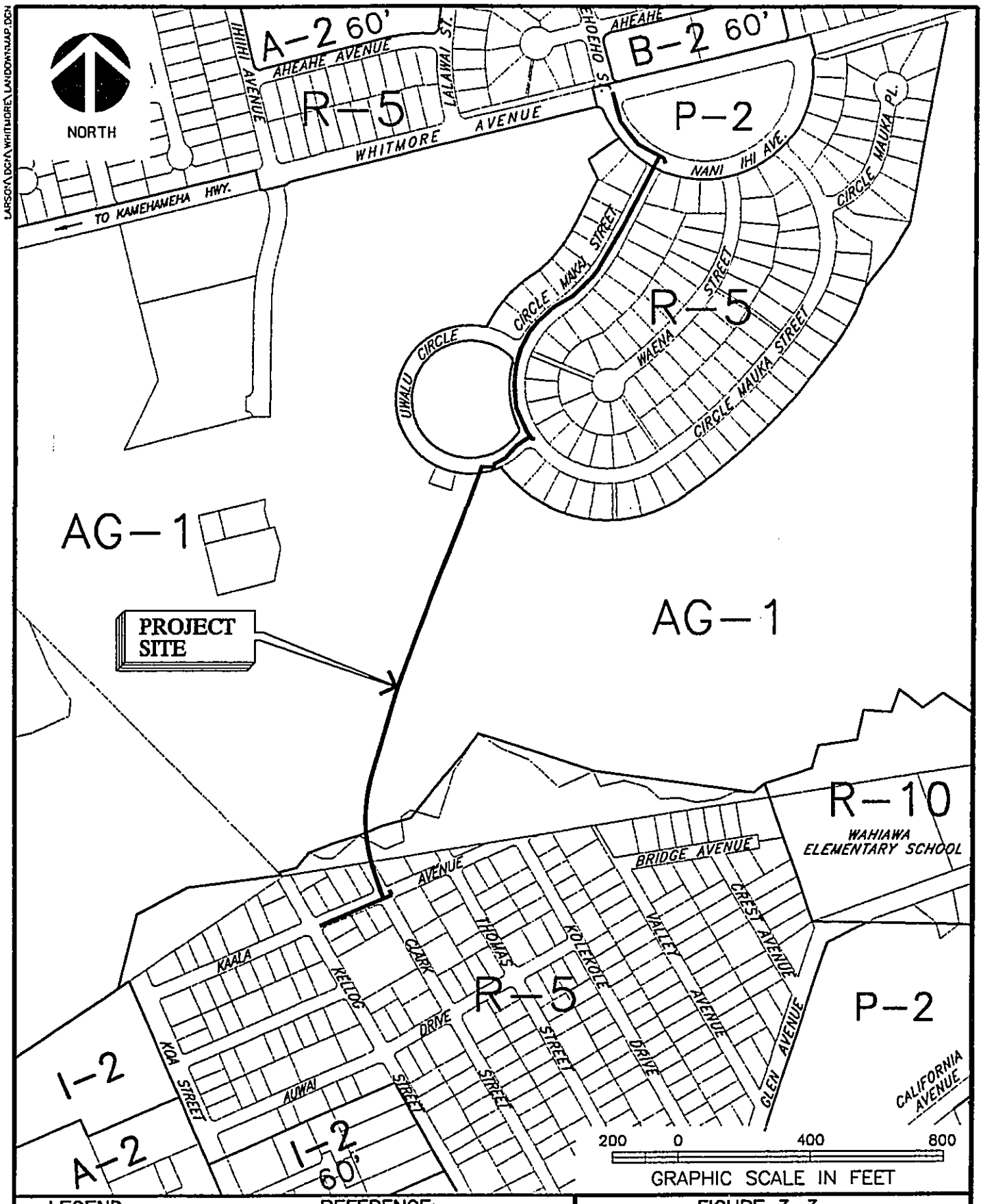
STATE LAND USE COMMISSION DISTRICT BOUNDARY MAPS
0-4, 0-5, 0-8, 0-9

1000 0 2000 4000

GRAPHIC SCALE IN FEET

FIGURE 3-2

STATE LAND USE MAP



LEGEND:

P-2	GENERAL PRESERVATION
R-10	RESIDENTIAL
R-5	RESIDENTIAL
A-2	APARTMENT
B-2	COMMUNITY BUSINESS
I-2	INTENSIVE INDUSTRIAL
AG-1	RESTRICTED AGRICULTURAL

REFERENCE:

CITY AND COUNTY OF HONOLULU
ZONING MAP NO. 11
(WAHIAWA-WHITMORE)

FIGURE 3-3

ZONING MAP

CHAPTER 4
POTENTIAL IMPACTS AND MITIGATION MEASURES

The intent of this chapter is to describe the potential impacts to the existing physical and social environment which may result from construction and operation of the proposed action. Mitigation measures which will be employed to minimize negative impacts are also discussed in this chapter.

Potential impacts may be classified as "short term" or "long term". Short term impacts are generally associated with construction activities. Long term impacts are those which are lasting, resulting from the presence or operation of the project after it is constructed.

4.1 REGIONAL IMPACTS

The proposed project will have a positive long term impact on the region by improving the reliability of the municipal water system presently serving Whitmore Village. The proposed project is not expected to stimulate population growth in the region. Moreover, the water main will be installed underground, and therefore is not anticipated to impact cultural resources or have a long term visual impact on the surrounding landscape.

Short term regional impacts will be associated with construction activities, including: increased traffic on regional roads; and increased dust and noise in the general vicinity of the project. These impacts and their proposed mitigation are discussed further in **Sections 4.11, 4.12** and **4.13.**

4.2 TOPOGRAPHY

Impact to the existing topography will be minimal. The proposed water main will be laid in an excavated trench with a minimum of three feet of cover over the pipe. Within the undeveloped gulch area, existing grades will be maintained once the trench is filled, although slight variations will occur as required to construct the service road. The portion of water main crossing Wahiawa Reservoir will be lowered to rest directly on the reservoir floor and should settle into the mud and bottom debris without much impact to the topography.

4.3 SOIL EROSION

It is anticipated that there will be a short term increase in soil erosion during construction. Removal of existing vegetation and trenching will result in bare soil which is subject to erosion. Particularly vulnerable areas are those located along the steep gulch slopes fronting Wahiawa Reservoir. Construction of the proposed reservoir crossing will be scheduled for the drier summer months to avoid winter storm flows.

Mitigative measures will be implemented during construction to minimize soil erosion and offsite sediment transport. The contractor will be required to implement control measures as shown on the construction drawings. These control measures may include:

- Installation of debris barriers at existing drainage inlets and catch basins along the proposed water main route to minimize deposition of construction-related trash and sediment within the municipal storm drain system.

- Installation of silt fences or erosion control berms to protect areas downstream of graded areas.

- Installation of cut-off ditches or berms to convey offsite runoff around graded areas.

Clearing and grubbing will be conducted in accordance with Chapter 14, "Grading, Soil Erosion, and Sediment Control," of the Revised Ordinances of Honolulu, 1990, as amended.

Areas cleared of vegetation will be revegetated as soon as possible to prevent soil loss. According to Char & Associates, Hilo grass can be planted on the slopes of the Wahiawa side of the reservoir and manienie 'ula or golden beardgrass can be planted on the slopes of the Whitmore Village side. Placement of erosion control matting on the steep, eroded slopes of the Whitmore Village side may be required in order to establish new vegetation.

Upon completion of construction, the erosion potential for the project site should improve over existing conditions. The service road proposed along the Wahiawa side of the reservoir will be stabilized with six inches of base course over a geotextile fabric, replacing an existing dirt road and ultimately decreasing the erodible surface area.

4.4 WATER QUALITY

While the most obvious problem facing the aquatic ecosystem entails the potential for significant quantities of soil to be washed into the reservoir, the actual adverse impact of this action would be relatively minor. The reservoir represents a point in Kaukonahua Stream where accumulation of sediment is occurring as a result of the stream having been dammed nearly a century ago. Much of the sediment naturally carried by both forks upstream of the reservoir naturally ends up in the reservoir. A portion of the suspended material may be carried over the dam during freshets or floods, or removed during irrigation withdrawal. However, a majority of the sediment contributes to the process of infilling, the ultimate fate of the reservoir.

In conclusion, water quality and ecosystem implications of sediment-laden runoff from the project are minor in comparison with natural processes of erosion occurring in the area and contributing sediment to Wahiawa Reservoir during rain storms.

4.5 FLOOD HAZARD

The project site is not located within a flood zone. Conversely, construction of the proposed water main will not result in increased flooding of surrounding areas.

4.6 FLORA

The proposed project is not expected to have a significant negative impact on botanical resources or affect any wetlands. None of the plants observed during the botanical survey is a

threatened or endangered species, or a species of concern. All of the plants can be found in similar environmental habitats throughout the Hawaiian Islands.

4.7 AQUATIC FLORA AND FAUNA

No aquatic species listed as endangered or threatened were detected during the field reconnaissance. Although its presence was not apparent during the field reconnaissance, the black-crowned night heron, an indigenous species protected from hunting, capture, or export, may utilize the aquatic portion of the project site. It is anticipated that water birds and fishes will avoid the immediate project area during construction due to the increased noise and activity. Due to the depth of the reservoir, free movement of aquatic species will be maintained throughout construction of the crossing. Once construction has been completed, the water main should have no impact on aquatic flora and fauna.

4.8 ARCHAEOLOGICAL AND HISTORIC RESOURCES

The proposed project is not anticipated to impact archaeological and historic resources. According to Cultural Surveys Hawaii, Inc., no further archaeological investigation is needed. In addition, archaeological monitoring during construction activities is not warranted. The State Historic Preservation Division (SHPD) also concluded that the project would have "no effect" on significant historic sites (see **Appendix B**).

However, in the unlikely event that inadvertent discoveries of human remains or other cultural deposits are made during construction, work will be halted in the immediate area and the SHPD and the Oahu Island Burial Council will be contacted for direction.

4.9 CULTURAL RESOURCES

The proposed project is not anticipated to impact cultural resources. There were no significant archaeological or historic resources identified at the project site. Further, the botanical survey did not identify any unique flora and stated that all plants could be found in similar habitats throughout the Hawaiian Islands.

4.10 LAND USE AND ZONING

The proposed project will not require a change in the existing land use or zoning. Construction of the proposed water main is a utility installation which is recognized as a principal use in all zoning districts.

4.11 LAND OWNERSHIP AND NEIGHBORING LANDS

In order to construct the proposed project, the Board of Water Supply will require easements from private landowners. Granting of easements may be viewed as a negative impact to land owners if they have conflicting plans for their property.

In addition, residences along the proposed alignment will be temporarily inconvenienced during construction by increased traffic, dust and noise. These construction-related impacts and proposed mitigation measures are discussed in the following sections.

4.12 TRAFFIC

The proposed project will have a short term impact on traffic along the affected roadways. Traffic impacts will be limited to the period of construction only, and are expected to include the following:

- temporary closure of one lane of Whitmore Avenue while working in the intersection;
- temporary detours with limited access for local traffic only while working within the residential streets;
- temporary increase in construction-related traffic along the affected roads and neighboring roads due to commuting workers, trucks and other construction equipment; and
- temporary increase in on-street parking congestion on neighboring roads due to limited parking on affected streets.

These short term impacts will be mitigated by implementation of the following measures:

- The Board of Water Supply will notify the Wahiawa Neighborhood Board and area residents prior to the onset of construction activities.
- Traffic control plans will be prepared and submitted to the State Department of Transportation and the Department of Planning and Permitting for approval. The traffic control plans will include measures to safely route traffic around the proposed construction area.
- The contractor will be required to notify emergency services (fire, ambulance, police); Oahu Transit Services, Inc.; and The Handi-Van of any lane closures or detours.
- Construction operations will be scheduled to avoid peak traffic conditions.
- The contractor will be required to maintain a storage yard for construction materials and vehicles at a legally designated site to minimize illegal parking and ensure pedestrian safety.

Once construction is completed, the proposed project will not have a long term impact on traffic or parking.

4.13 AIR QUALITY

During construction, generation of fugitive dust and exhaust emissions from equipment may result in a temporary impact on air quality.

The contractor will required to comply with the provisions of Chapter 11-60.1, "Air Pollution Control", Section 11-60.1-33 on Fugitive Dust. To ensure compliance with state air pollution control regulations, an effective dust control plan must be implemented by the contractor. The following mitigation measures will be implemented:

- An adequate water source will be provided prior to the start-up of construction activities.
- Bare areas, including slopes, will be landscaped, paved or stabilized by other means as soon as physically possible.
- Affected and adjacent roadways will be kept clean.
- Adequate dust control measures will be provided during weekends, after hours, and prior to daily start-up of construction activities.
- Open-bodied trucks will be covered when hauling material and/or debris.
- Aggregate-stabilized pads will be provided for construction ingress/egress at off-road areas to minimize tracking dirt and debris on paved streets.

In addition, the contractor will be required to implement measures to minimize air quality degradation by other sources, including vehicle exhaust emissions. Exhaust emissions may be minimized by inspecting construction vehicles, and scheduling movement of construction vehicles to off-peak hours.

The BWS requires all construction work to comply with dust and exhaust emission limits set forth by the state Department of Health. Should these limits be exceeded, the contractor's work will be stopped until corrective measures are taken.

There will be no long term impact on air quality associated with the proposed project.

4.14 NOISE

Noise generated by construction activities will be a short term impact. The actual levels would be dependent on the methods employed by the contractor.

As with most development projects, construction noise will likely exceed the allowable limits. Consequently, a Community Noise Permit for Construction Activities will be obtained from the state Department of Health. The permit will specify the allowable conditions under which noise-producing operations can occur (i.e. restricted time periods of the day, restricted days, etc.). Construction equipment that emit exhaust gas, or air and roadway transit vehicles will be equipped with mufflers.

The BWS requires all construction work to comply with noise limits set forth by the state Department of Health. Should these limits be exceeded, the contractor's work will be stopped until corrective measures are taken.

4.15 UTILITIES

As planning and design proceeds, the proposed project will be coordinated with appropriate agencies within the City and County of Honolulu, Hawaiian Electric Company, Verizon Hawaii, The Gas Company and Oceanic Cable to minimize impacts on existing utilities. The contractor will be required to verify the location of all existing utilities prior to excavation, and will be responsible for protecting existing utilities during construction. Any resulting damage to existing utilities will be repaired and paid for by the contractor.

CHAPTER 5
ALTERNATIVES TO THE PROPOSED ACTION

This chapter discusses alternatives against which the proposed action was evaluated. The alternatives were rejected for their inability to meet the project objectives or attainment of the objectives at a higher cost (financially or environmentally).

To restate, the BWS objectives for this project are:

- to ensure reliable water service is provided to the community of Whitmore Village by strengthening the distribution network with Wahiawa; and
- to minimize impacts to the surrounding community and environment which may result from construction and or operation of the project.

5.1 NO ACTION

Under the "no action" scenario municipal water for Whitmore Village would continue to be supplied by a single water main under the Wahiawa Reservoir that was constructed over 50 years ago. This scenario fails to meet the project objective of ensuring reliable water service.

5.2 REHABILITATION OF EXISTING WATER MAIN

Rehabilitation of the existing water main by sliplining was addressed by Stanley Yim & Associates, Inc. in their 1998 feasibility study as a means of extending the service life of the water main. Although sliplining would strengthen the existing water main, a second interconnection would not be added and therefore the existing problem facing Whitmore Village would remain unresolved should a break or service shut-down occur.

The sliplining procedure itself would require shutting down the existing water main for an extended period. Additionally, the old pipe may be damaged during cleaning prior to sliplining, and top and bottom vertical bends may be damaged during the sliplining procedure.

5.3 ALTERNATIVE CONSTRUCTION METHOD

Engineering Concepts, Inc. evaluated horizontal directional drilling as an alternative construction method for crossing Wahiawa Reservoir in their April 2000 report. Horizontal directional drilling was the only trenchless construction method that appeared to be feasible or practical for the project. With this method, the water main would be constructed of high density polyethylene (HDPE) pipe aligned within a bored hole located approximately 20 feet below grade. Environmental impacts to the reservoir and gulch would be minimized due to the trenchless construction. However, there would be a greater impact on the surrounding residential areas during construction. Affected areas include Clark Street north of Kaala Avenue, Uwalu Circle and Circle Makai Street. The greatest impact would be to Clark Street residences due to construction noise and the inability to access their driveways over the entire

three week time period estimated for the horizontal directional drilling procedure. Another major disadvantage of this alternative is that large diameter HDPE pipes are not recognized in the BWS standards, and the BWS is not familiar with maintenance and repair techniques for HDPE pipes. Further, the construction cost for horizontal directional drilling is expected to be slightly higher than the proposed action due to shipment of the drilling equipment to Oahu from the mainland.

5.4 ALTERNATIVE ALIGNMENTS

The proposed transmission main alignment was one of four alternative alignments evaluated by Stanley Yim & Associates, Inc. in their 1998 feasibility study. The other three alternative alignments are illustrated on **Figure 5-1** and described below.

5.4.1 Alternative 1 - Kamehameha Highway from California Avenue to Whitmore Avenue

Alternative 1 involves construction of a 16-inch water main along California Avenue, Mango Street, Kilani Avenue, Kamehameha Highway, and Whitmore Avenue. In Wahiawa, the connection point is an existing 12-inch water main at the intersection of California Avenue and Circle Drive. The Whitmore Village connection is the existing 12-inch water main in Whitmore Avenue. This alignment requires crossing Wahiawa Reservoir by either suspending the pipe beneath the Karsten Thot Bridge or constructing a separate supporting structure next to the bridge for the same purpose.

At 12,300 feet, Alternative 1 is the longest alignment and has the longest estimated construction time (23 to 29 months). However, its advantage is that the alignment is located entirely with the right-of-way of existing roads. This alternative may also be subject to a Conservation District Use Permit (CDUP). A boundary interpretation would be required due to location of the Conservation District boundary near the Karsten Thot Bridge. It should be noted that the Karsten Thot Bridge is a historic bridge eligible for both the National and Hawaii Register of Historic Places.

5.4.2 Alternative 2 - Kamehameha Highway from Kilani Avenue to Whitmore Avenue

Alternative 2 involves construction of a 16-inch water main in Kilani Avenue, Kamehameha Highway and Whitmore Avenue. The Wahiawa end would connect to an existing 12-inch water main at the intersection of Kilani Avenue and Kellog Street. The Whitmore Avenue connection point and the reservoir crossing would be the same as Alternative 1. This alternative would be subject to the same permits, impacts and concerns as Alternative 1. However, the Alternative 2 alignment is shorter (11,600 feet) as is the construction time (21 to 27 months). The disadvantage of Alternative 2 compared to Alternative 1 is that Kilani Avenue is crowded with existing utilities compared to California Avenue.

5.4.3 Alternative 3 - Parallel to Existing Water Main

Alternative 3 involves construction of a 16-inch water main in Kellog Street from the Kaala Avenue intersection (connection to an existing 12-inch water main), crossing the gulch and reservoir, and connection to the existing 12-inch water main in Whitmore Avenue. The gulch and reservoir crossing proposed in this alternative is parallel and in close proximity to the

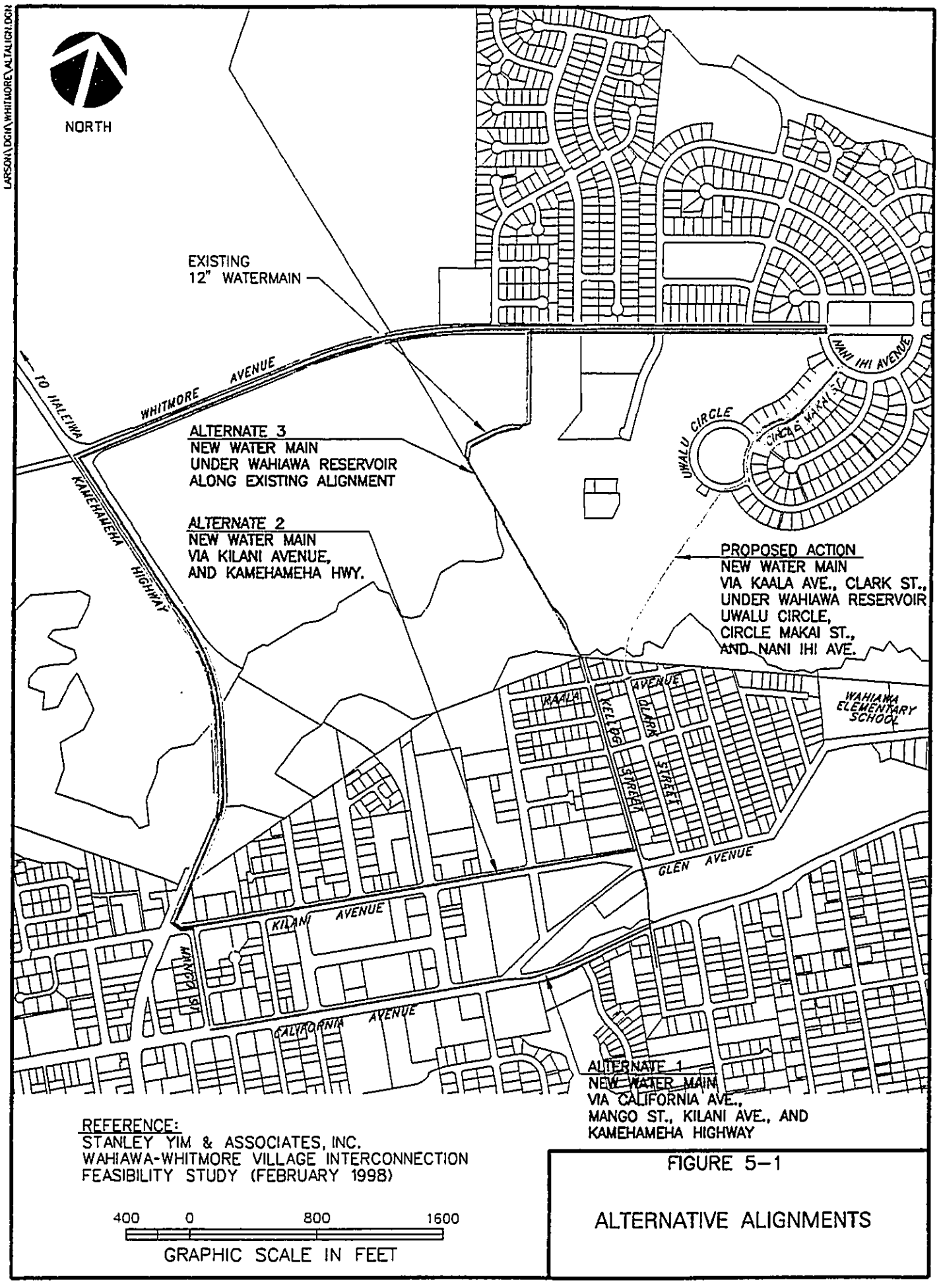


FIGURE 5–1

ALTERNATIVE ALIGNMENTS

existing Wahiawa-Whitmore Village water main. The alignment for Alternative 3 is about 5,000 feet in length, and would require a construction time of 20 months. The environmental permits required for the proposed action would also be applicable to Alternative 3. A CDUP would not be required as in Alternatives 1 and 2. A major disadvantage of Alternative 3 is that the water main is susceptible to damage should the existing main break.

CHAPTER 6
FINDINGS AND DETERMINATION

6.1 DETERMINATION

The City and County of Honolulu Board of Water Supply (BWS) has concluded that the proposed project does not have the potential to generate significant environmental impacts and the need to prepare an environmental impact statement is not evident. Therefore, this Final Environmental Assessment has been submitted with a Finding of No Significant Impact (FONSI) determination.

6.2 FINDINGS AND REASONS SUPPORTING DETERMINATION

The overall and cumulative impacts of the proposed action were evaluated with respect to Hawaii Administrative Rules (HAR) Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-12 "Significance Criteria" and the City and County of Honolulu's plans and policies. The following findings and conclusions can be made in support of the FONSI determination.

Environmental Impact Statement Rules, Chapter 200, HAR

(1) *The proposed action will not involve an irrevocable commitment to loss or destruction of any natural or cultural resource.*

The two ends of the proposed water main alignment will be located within existing paved roads. The central portion will be located within presently undeveloped lands and cross Wahiawa Reservoir. No natural or cultural resources were identified along the proposed water main alignment.

(2) *The proposed action will not curtail the range of beneficial uses of the environment.*

The proposed water main will be constructed underground and should not curtail other above ground uses. However, establishment of the associated 20-foot wide easement through private lands may limit the landowners plans for the property.

(3) *The proposed action will not conflict with the state's long term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

Construction of the proposed water line will comply with the environmental policies, goals and guidelines of Chapter 344, HRS.

(4) *The proposed action will not have a substantial negative effect on the economic or social welfare of the community or state.*

Construction of the proposed water main will have a positive effect on the welfare of the community of Whitmore Village. The proposed action will strengthen the water

distribution network to ensure transmission of municipal water for domestic consumption and fire protection.

(5) *The proposed action will not have a substantial negative effect on public health.*

Construction activities may temporarily increase noise, fugitive dust and vehicular air emissions in the project vicinity. However, these impacts will cease upon completion of construction. No long term negative impact on public health is foreseen. Rather, the long term impact will be a positive effect on public health by strengthening the water distribution network.

(6) *The proposed action will not involve substantial secondary impacts, such as population changes or effects on public facilities.*

The proposed water main interconnection is not anticipated to incite population growth or changes. The project will have a positive impact on municipal water facilities.

(7) *The proposed action does not involve substantial degradation of environmental quality.*

There are no long-term impacts anticipated. Construction activities will temporarily increase dust, noise and traffic. Wahiawa Reservoir water quality will also be impacted temporarily due to trenching at the waters' edge and on the banks. However, upon completion of construction, these impacts will cease. Mitigation measures to minimize these construction-related impacts have been described in **Chapter 4**.

(8) *The proposed action will not have a considerable cumulative effect upon the environment or involve a commitment for larger actions.*

The proposed action is limited to construction of a water main to strengthen the existing municipal water system serving Whitmore Village. The proposed action will not increase pumpage or storage capabilities, or expand the existing service zone.

(9) *The proposed action will not substantially affect a rare, threatened, or endangered species or its habitat.*

There were no rare, threatened or endangered species evident during the botanical and aquatic resources field investigations. In addition, there was no indication that the project site provided habitat for a rare, threatened or endangered species.

(10) *The proposed action will not affect air or water quality or ambient noise levels.*

Construction activities will have a short-term impact on air quality, water quality and ambient noise levels. However, these impacts will be mitigated as describe in **Chapter 4**. No long term impacts to air quality, water quality or ambient noise levels are foreseen.

(11) *The proposed action will not affect, nor is it likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal water.*

The proposed water main will span Wahiawa Reservoir and trenching will be required on the erosion-prone slopes of its banks. Areas disturbed by trenching will be revegetated as soon as possible to minimize erosion. The water main will be jacketed in concrete for added protection along the steep bank slopes. Refer to **Chapter 4** for more information on minimizing soil erosion.

(12) *The proposed action will not substantially affect scenic vistas or viewplanes identified in county or state plans or studies.*

The proposed water main will be installed underground, and will not affect scenic vistas or viewplanes.

(13) *The proposed action will not require substantial energy consumption.*

The proposed water line will connect to the existing BWS 1180 service zone. Water within this system flows by gravity from the existing BWS 1180 reservoir(s) to the end user within the community. There will be no long term increase in energy consumption associated with the proposed water main.

In addition, the proposed project is consistent with the City and County of Honolulu's General Plan, Development Plan Common Provisions and Development Plan Special Provisions for Central Oahu:

City and County of Honolulu General Plan

Objective B, Policy 1: Develop and maintain an adequate supply of water for both residents and visitors.

This project will improve the reliability of water service to residents by providing a second interconnection main from Wahiawa to the Whitmore Village community. This will ensure a continuous supply of water for domestic consumption and fire protection.

City and County of Honolulu Development Plan

Common Provisions (Section 24-1.9): Priority in the programming will be given to those capital improvement projects that will improve or replace public facilities in unsound condition.

The existing transmission line is over 50 years old and provides the only source of potable water to Whitmore Village. A major break along the existing 50-year old water main from Wahiawa to Whitmore Village would sever water service to residents. This project will provide for a second interconnection main from Wahiawa to Whitmore Village ensuring continued water service.

Special Provisions (Section 24-5-5.3(a)): Planning, funding, and construction of projects involving public facilities improvements, i.e., wastewater management, transportation, and potable water will be given priority.

Construction of a second interconnection main would also improve water transmission to Whitmore Village by creating a loop distribution network. This will prevent water from stagnating at dead ends of the system.

CHAPTER 7
CONSULTATION

7.1 PARTICIPANTS

This Final Environmental Assessment (EA) was prepared for the City and County of Honolulu Board of Water Supply by Engineering Concepts, Inc. The following consultants were also involved in preparation of this document:

Consultant	Area of Expertise
AECOS, Inc.	Aquatic Resources
Char & Associates	Botanical Resources
Cultural Surveys Hawaii, Inc.	Archaeological / Historic Resources

7.2 PARTIES CONSULTED DURING PREPARATION OF THE DRAFT EA

Preliminary consultation with agencies was conducted during preparation of the Draft EA and during the previous planning studies. Selected correspondence is included in **Appendix A.** The following parties were consulted:

U.S. Army Corps of Engineers, Operations Branch
U.S. Coast Guard, Aids to Navigation Branch
U.S. Fish and Wildlife Service, Pacific Islands Ecoregion
State of Hawaii, Office of Planning
State of Hawaii, Department of Health
State of Hawaii, Department of Land and Natural Resources:
- State Historic Preservation Division
- Land Division
- Commission on Water Resource Management

State of Hawaii, Department of Transportation

7.3 PARTIES CONSULTED DURING PREPARATION OF THE FINAL EA

Sixty-six copies of the Draft EA were distributed to agencies, organizations and other interested parties. A complete listing of these consulted parties is included in **Table 7-1.** Availability of the Draft EA was published in the August 8, 2001 edition of *The Environmental Notice* by the Office of Environmental Quality Control. A total of 18 comment letters were received as of October 3, 2001 (the public review period ended on September 7, 2001). Agencies, organizations and other interested parties responding to the request for comments are indicated with a "C" in **Table 7-1.** Those parties responding with "no comments" are labeled with a "NC".

7.4 COMMENTS ON THE DRAFT EA

Comment letters received as a result of public review of the Draft EA and Board of Water Supply responses have been included in **Appendix B.**

TABLE 7-1
DRAFT EA DISTRIBUTION LIST

	FEDERAL GOVERNMENT
	U.S. Army Engineer District, Honolulu
NC	U.S. Department of the Navy: Commander, Navy Region Hawaii Commanding Officer, NCTAMS PAC
	U.S. Fish and Wildlife Service, Pacific Islands Ecoregion
C	U.S. Geological Survey, Water Resources Division
	U.S. Natural Resources Conservation Service
	STATE GOVERNMENT
	Senator Robert Bunda, 22nd District
	Representative Marcus R. Oshiro, 40th District
NC	Dept. of Accounting and General Services
	Dept. of Agriculture
	Dept. of Business, Economic Development & Tourism
NC	Dept. of Hawaiian Home Lands, Hawaiian Homes Commission
	Dept. of Health, Environmental Planning Office
C C	Dept. of Land and Natural Resources: Chairperson Commission on Water Resource Management State Historic Preservation Division
	Dept. of Transportation
C	Office of Environmental Quality Control
C	Office of Hawaiian Affairs
	University of Hawaii Environmental Center
	CITY AND COUNTY GOVERNMENT
	Councilmember Rene Mansho, District I
	Board of Water Supply
NC	Dept. of Design and Construction
	Dept. of Environmental Services
	Dept. of Facility Maintenance
C	Dept. of Parks and Recreation
C	Dept. of Planning and Permitting
C	Dept. of Transportation Services
C	Honolulu Fire Department
C	Honolulu Police Department

TABLE 7-1 (continued)

OTHER INTERESTED PARTIES	
	Hawaiian Electric Company, Inc.
C	Verizon Hawaii, Inc.
C	Oceanic Cable
C	The Gas Company
	Wahiawa Neighborhood Board No. 26
	Wahiawa Community & Business Association, Inc.
	Whitmore Community Association
	Dole Food Company, Inc.
	Kenneth Komori Trust / Kae Komori Trust
C	The Friends of Kukaniloko (Thomas Lenchanko)
LIBRARIES	
	State Main Library
	Wahiawa Public Library

REFERENCES

Engineering Concepts, Inc., *Alternative Construction Methods for the Wahiawa-Whitmore Village Interconnection: 16-Inch Water Main, Wahiawa, Oahu, Hawaii*, prepared for the City and County of Honolulu Board of Water Supply, April 2000.

Hawaii State, Department of Health, Title 11, *Department of Health Administrative Rules*, "Chapter 200 - Environmental Impact Statement Rules", August 20, 1996.

Hawaii State, Department of Health, *Title 11, Department of Health Administrative Rules*, "Chapter 46 - Community Noise Control", September 23, 1996.

Hawaii State, Department of Health, *Title 11, Department of Health Administrative Rules*, "Chapter 60.1 - Air Pollution Control", October 29, 1993.

Honolulu, City and County of, Department of Land Utilization, *Land Use Ordinance*, 1997.

Honolulu, City and County of, Department of Public Works, Division of Land Survey and Acquisition, *Street Index, Island of Oahu*, January 1996.

U.S. Department of Agriculture Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, August 1972.

Stanley Yim & Associates, Inc., *Wahiawa-Whitmore Village Interconnection Feasibility Study, Wahiawa-Whitmore, Oahu, Hawaii*, prepared for the City and County of Honolulu Board of Water Supply, February 1998.

APPENDIX A

CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

JUN 10 1997

In Reply Refer To: CMC

Jason K. H. Yim
Stanley Yim & Associates, Inc.
Bishop Square Pacific Tower, Suite 110
1001 Bishop Street
Honolulu, Hawaii 96813

Re: Wahiawa-Whitmore Village Interconnection Feasibility Study, Wahiawa, Oahu, Hawaii

Dear Mr. Yim:

The U.S. Fish and Wildlife Service (Service) has reviewed the information provided in your facsimile transmission of May 30, 1997. The proposed project by Stanley Yim & Associates involves preparing a feasibility study for the installation of a new water line from Wehiawa to Whitmore Village and/or the installation of a new water line nearby Whitmore Village to Whitmore Village. ~~Three~~ Four alternate routes are being considered. The project sponsor is the City and County of Honolulu Board of Water Supply.

The Service has reviewed the provided information as well as other information contained in our files, including maps prepared by The Nature Conservancy's Hawaii Natural Heritage Program. To the best of our knowledge, there are no federally endangered, threatened, or candidate species directly within the project site. Because the project will be located within a previously disturbed site, the Service does not anticipate significant adverse impacts to fish and wildlife resources.

If you have questions or comments, please contact Fish and Wildlife Biologist Christina Crooker at (808) 541-3441.

RECEIVED
JUN 12 1997
STANLEY YIM & ASSOC., INC.
Time ____

Sincerely,

Brooks Harper

Brooks Harper
Field Supervisor
Ecological Services

U.S. Department of Transportation
United States Coast Guard

Commander
Fourteenth Coast Guard District

300 Ala Moana Blvd., 9th Floor
Honolulu, HI 96850-4982
Staff Symbol (oan)
Phone: (808) 541-2315
FAX: (808) 541-2309

16590
Serial 32053
26 Nov 1997

Stanley Yim & Associates, Inc.
1001 Bishop Street, Suite 410
Honolulu, HI 96813

Dear Mr. Yim:

We have reviewed your letter of 18 November 1997 requesting U. S. Coast Guard input to four alternatives for routing a waterline near Kaukonahua Stream, Wahiawa, Oahu, Hawaii. Kaukonahua Stream is not considered to be a navigational waterway as outlined in 33 CFR part 114.10 and, therefore, a Coast Guard permit is not required.

Thank you for taking the time to write and inform us of your project.

Sincerely,

T. D. Hooper

T. D. HOOPER
Commander, U. S. Coast Guard
Chief, Aids to Navigation Branch
By direction of the District Commander

RECEIVED
DEC 2 1997
STANLEY YIM & ASSOC., INC.
Time ____

ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 31, 2000

Mr. George P. Young, P.E., Chief
Regulatory Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96850-5440

Attention: *Mr. Benton Ching*

Subject: Wahiawa-Whitmore Village 16-Inch Water Main Interconnection,
Wahiawa, Oahu, Hawaii
Army File No. 970000102

The City and County of Honolulu Board of Water Supply (BWS) is proposing to construct a 16-inch water main to provide a second interconnection between the municipal water systems serving the communities of Wahiawa and Whitmore Village in central Oahu. The proposed water main alignment requires crossing Wahiawa Reservoir along the North Fork of Kaukonahua Stream.

Previous correspondence with your office was initiated by Stanley Yim & Associates, Inc. in 1997 during preparation of a feasibility study for the project. The feasibility study addressed several alternative alignments for the proposed water main. Subsequently, the BWS selected an alignment and contracted Engineering Concepts, Inc. to prepare an environmental assessment in accordance with Chapter 343, Hawaii Revised Statutes.

The purpose of this correspondence is to request a determination of the Army permit requirements for the project and to solicit your concerns to ensure that they will be addressed in the environmental assessment. A brief description of the proposed project at the reservoir crossing is enclosed for your use.

Should you have any questions or require additional information, please call me or Dana Arakaki at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Vice President

enclosure

1150 South King Street, Suite 700 Honolulu, Hawaii 96814
Tel: (808) 591-8820 Fax: (808) 591-9010 E-Mail Address: eci@gte.net

BWS Wahiawa-Whitmore Village 16-inch Water Main Interconnection

Project Background

The City and County of Honolulu Board of Water Supply (BWS) is proposing to construct a 16-inch water main to provide a second interconnection between the municipal water systems serving the communities of Wahiawa and Whitmore Village in central Oahu. The two ends of the proposed water main will be constructed within existing public roads in Wahiawa and Whitmore Village. However, the central portion located between Clark Street in Wahiawa and Uwalu Circle in Whitmore Village will be located within undeveloped private lands.

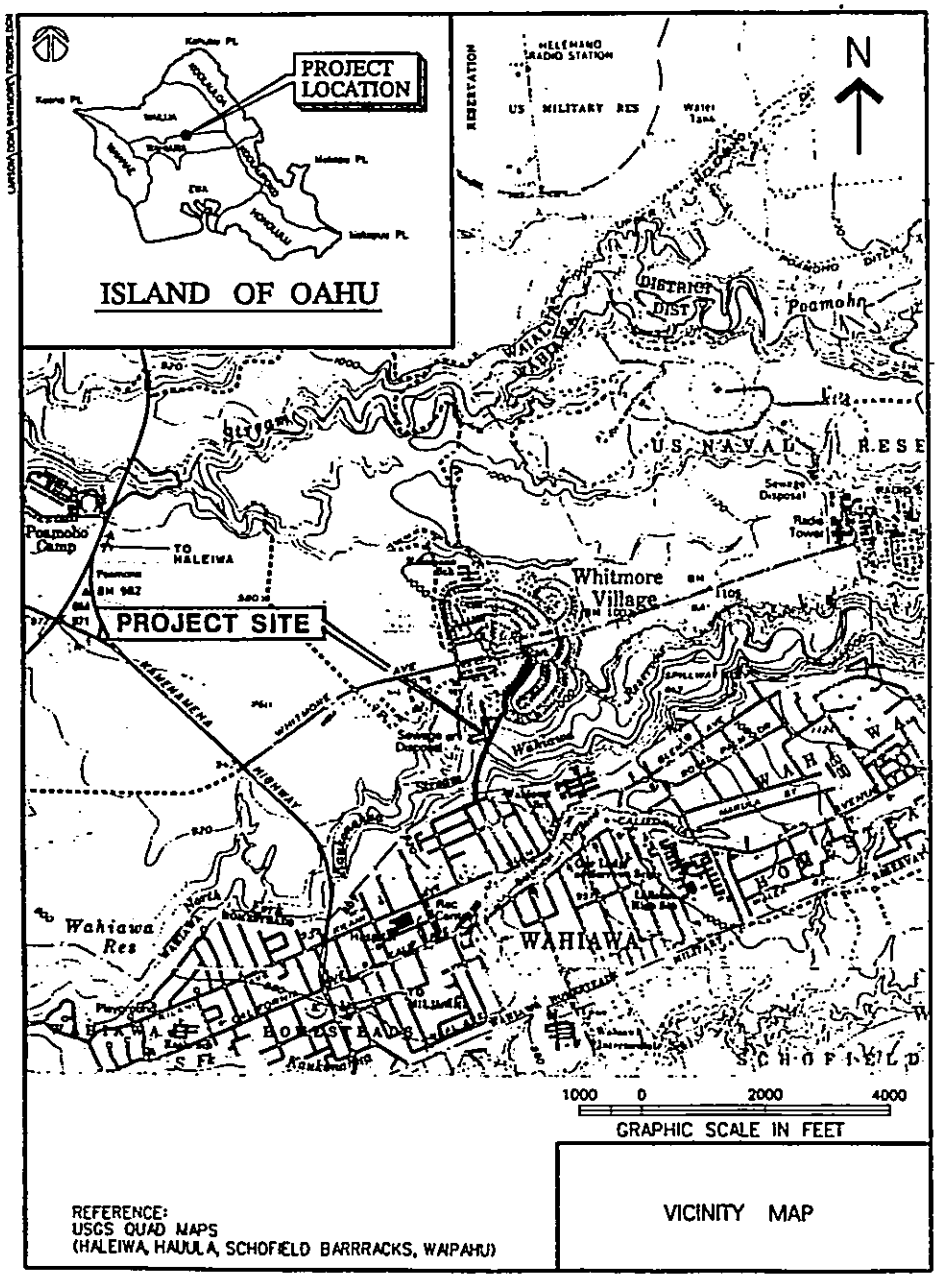
Reservoir Crossing

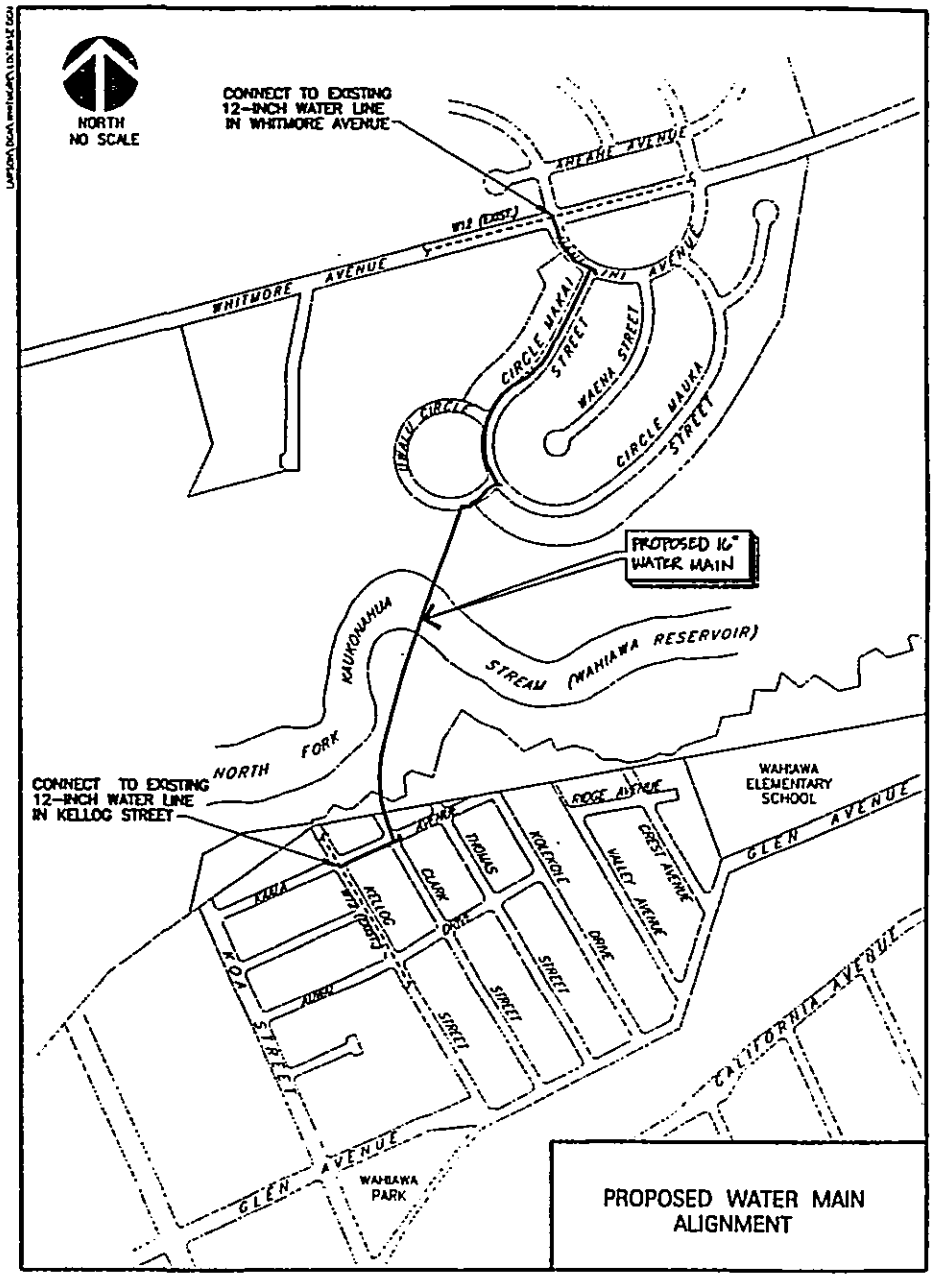
Approximately 190 feet of water line will be laid across Wahiawa Reservoir and in trenches adjacent to the reservoir that have been excavated below the groundwater table. Use of ductile iron ball joint pipe is proposed for these portions of the pipeline. Ball joint pipe provides a strong, flexible joint without use of bolts that is well suited for underwater installations. Use of ball joint pipe would also allow the water main to rest on the reservoir bottom, eliminating the need to trench the reservoir invert. Use of ball joint pipe in the trenches on both banks enables laying the pipe in wet conditions, without dewatering.

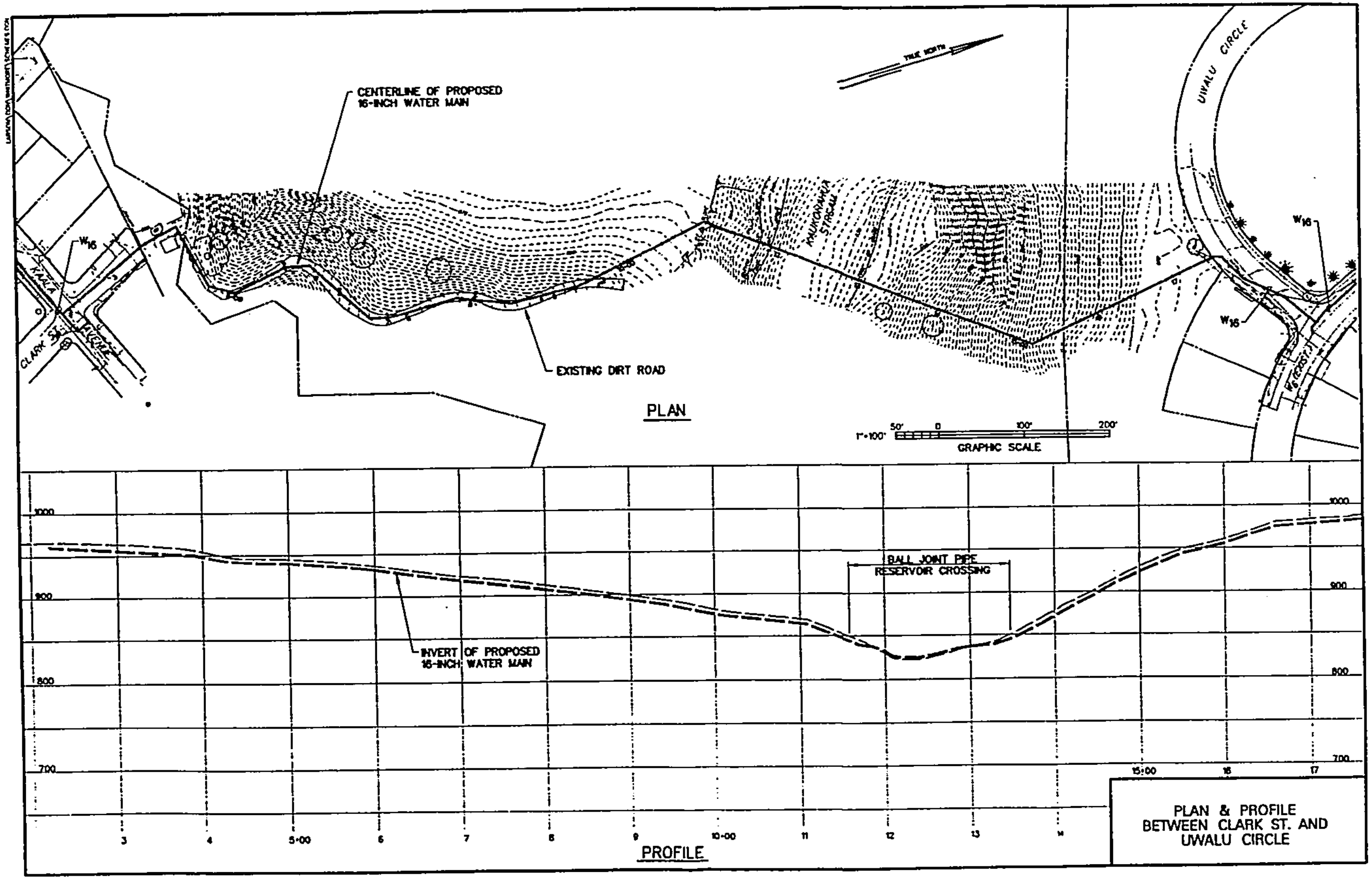
Trenching equipment will be anchored along the banks of the reservoir. The trench will be approximately five feet deep, in order to maintain at least three feet of cover above the pipe at the water line, with transition to shallower trench depths within the water. Segments of the ball joint pipe would be fitted together along the reservoir bank, strung across the reservoir and lowered into place. The pipe is expected to settle into the layer of mud at the reservoir invert. The trenched portion along both banks will then be backfilled.

Construction Schedule

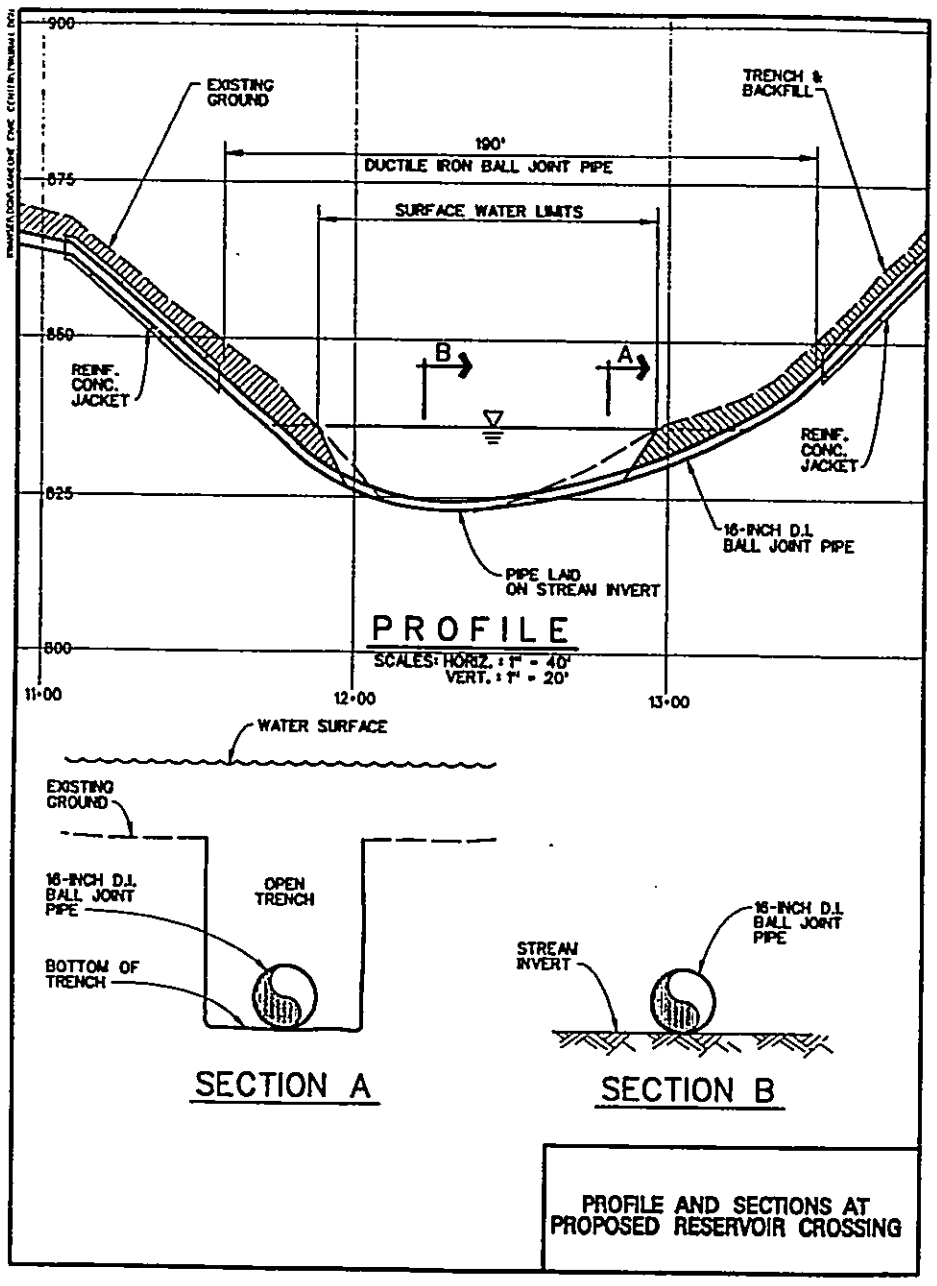
The proposed project is scheduled for construction in late 2001. The actual start date will be dependent on completion of the environmental assessment and obtaining the required permits and approvals. It is anticipated that construction will take 16 months to complete, including approximately five months to cross Wahiawa Reservoir. The estimated construction cost for the project is $710,000, to be funded by the BWS.


PROJECT LOCATION
ISLAND OF OAHU
N
PROJECT SITE
Whitmore Village
WAHIAWA
Wahiawa Res
Poamoho Camp
TO HALEIWA
1000 0 2000 4000
GRAPHIC SCALE IN FEET
REFERENCE:
USGS QUAD MAPS
(HALEIWA, HAUULA, SCHOFIELD BARRRACKS, WAIPAHU)
VICINITY MAP


NORTH
NO SCALE
CONNECT TO EXISTING 12-INCH WATER LINE IN WHITMORE AVENUE
WHITMORE AVENUE
AHEAHE AVENUE
CIRCLE MAKAI STREET
WAENA STREET
CIRCLE MAUKA STREET
PROPOSED 16" WATER MAIN
STREAM (WAHIAWA RESERVOIR)
NORTH FORK KAUKONAHUA
CONNECT TO EXISTING 12-INCH WATER LINE IN KELLOG STREET
WAHIAWA ELEMENTARY SCHOOL
GLEN AVENUE
KOA STREET
CALIFORNIA AVENUE
WAHIAWA PARK
PROPOSED WATER MAIN ALIGNMENT



PLAN & PROFILE BETWEEN CLARK ST. AND UWALU CIRCLE


900
875
850
825
800
11+00
12+00
13+00
EXISTING GROUND
TRENCH & BACKFILL
190'
DUCTILE IRON BALL JOINT PIPE
SURFACE WATER LIMITS
B
A
REINF. CONC. JACKET
REINF. CONC. JACKET
16-INCH D.I. BALL JOINT PIPE
PIPE LAID ON STREAM INVERT
PROFILE
SCALES: HORIZ. : 1" = 40'
VERT. : 1" = 20'
WATER SURFACE
EXISTING GROUND
16-INCH D.I. BALL JOINT PIPE
OPEN TRENCH
BOTTOM OF TRENCH
SECTION A
STREAM INVERT
16-INCH D.I. BALL JOINT PIPE
SECTION B
PROFILE AND SECTIONS AT PROPOSED RESERVOIR CROSSING

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

August 11, 2000

RECEIVED
AUG 16 2000
ENGINEERING CONCEPTS

Regulatory Branch

Mr. Kenneth Ishizaki
Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

This responds to your request dated July 31, 2000 requesting a jurisdictional determination for activities proposed at Wahiawa Reservoir, along the north fork of Kaukonahua Stream, Wahiawa, Oahu Island. Based on the evaluation of information provided by you, I have determined that waters of the U.S. are present and will be affected by the proposed project. Therefore, the Corps will require that a Department of Army permit application shall be submitted for those portions of the project that will entail ground disturbance, construction, and alteration as well as the placement of fill material within the limits of Wahiawa Reservoir and Kaukonahua Stream waters.

Please contact Mr. Farley Watanabe of my staff at 438-7701, facsimile 438-4060, if you have any questions or need additional information. Please refer to File Number 200000280 in any future correspondence with us. This file number supercedes the original file number 970000162.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 31, 2000

Ms. Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Attention: Mr. David Higa

Subject: Wahiawa-Whitmore Village 16-Inch Water Main Interconnection
Wahiawa, Oahu, Hawaii

The City and County of Honolulu Board of Water Supply (BWS) is proposing to construct a 16-inch water main to provide a second interconnection between the municipal water systems serving the communities of Wahiawa and Whitmore Village in central Oahu. The proposed water main alignment requires crossing Wahiawa Reservoir along the North Fork of Kaukonahua Stream.

Previous correspondence with your office was initiated by Stanley Yim & Associates, Inc. in 1997 during preparation of a feasibility study for the project. A copy of the August 7, 1997 memorandum from your office to the Land Division is enclosed for reference. The feasibility study addressed several alternative alignments for the proposed water main. Subsequently, the BWS selected an alignment and contracted Engineering Concepts, Inc. to prepare an environmental assessment in accordance with Chapter 343, Hawaii Revised Statutes.

The purpose of this correspondence is to confirm the need for a Stream Channel Alteration Permit and to solicit your concerns to ensure that they will be addressed in the environmental assessment. Input from the Division of Aquatic Resources would also be appreciated.

A brief description of the proposed project at the reservoir crossing is enclosed for your use. Should you have any questions or require additional information, please call me or Dana Arakaki at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Vice President

enclosure

1150 South King Street, Suite 700 Honolulu, Hawaii 96814
Tel. (808) 591-8820 Fax: (808) 591-9010 E-Mail Address: eci@gte.net

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON
CHAIRPERSON
ROBERT G. GIRAL
DAVID A. NOBRIGA
LAWRENCE H. MIIKE
RICHARD H. COX
HERBERT M. RICHARD
RAE M. LOUI, P.E.
DEPUTY

AUG 8 3 47 PM '97

August 7, 1997

TO: Mr. Dean Uchida, Administrator
Land Division

FROM: Rae M. Loui, Deputy Director
Commission on Water Resource Management (CWRM)

SUBJECT: Permit Requirements Re: Board of Water Supply's Proposed Wahiawa-Whitmore Village Interconnection Feasibility Study

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas which are important for the maintenance of streams and the replenishment of aquifers.

[X] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

[ ] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[X] A Well Construction Permit and a Pump Installation Permit from the CWRM would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the CWRM would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows. This may require an instream flow standard amendment.

[ ] We recommend that no development take place affecting highly erodible slopes which drain into streams within or adjacent to the project.

[ ] If the proposed project diverts additional water from streams or if new or modified stream diversions are planned, the project may need to obtain a stream diversion works permit and petition to amend the interim instream flow standard for the affected stream(s).

[ ] Based on the information provided, it appears that a Stream Channel Alteration Permit pursuant to Section 13-169-50, HAR will be required before the project can be implemented.

[ ] Based on the information provided, it does not appear that a Stream Channel Alteration Permit pursuant to Section 13-169-50, HAR will be required before the project can be implemented.

[ ] An amendment to the instream flow standard from the CWRM would be required before any streamwater is diverted.

[X] OTHER: If the selected alternative alters the bed or banks of streams the Board of Water Supply must obtain a stream channel alteration permit pursuant to HAR §13-169-50.

If there are any questions, please contact David Higa at 587-0249.

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

AUG 15 2000

Mr. Kenneth Ishizaki, P. E.
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

Thank you for your letter dated July 31, 2000 regarding the need for a stream channel alteration permit to place a new waterline under the North Fork of Kaukonahua Stream, Wahiawa, Oahu.

Your attachments to the letter indicates both the bed and the banks of the stream will be altered to accommodate the new waterline; therefore, a stream channel alteration permit pursuant to Hawaii Revised Statutes §174C-71 is required prior to construction work.

If you have any questions regarding this letter, please call David Higa at 587-0249.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

DH:sd

APPENDIX B

DRAFT EA COMMENTS AND RESPONSES

DEPARTMENT OF THE NAVY
COMMANDER
NAVY REGION HAWAII
517 RUSSELL AVENUE, SUITE 110
PEARL HARBOR, HAWAII 96860-4884

5090
Ser N465/
07 2001

Mr. Clifford S. Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu Hawaii 96843
Attn: Mr. Scot Muraoka

Dear Mr. Scot Muraoka:

We would like to thank you for an opportunity to review and comment on the Draft Environmental Assessment (EA) for Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii.

We have no comments at this time. Our point of contact is Ms. Amanda Manoi at 471-1171, extension 218.

Sincerely,

R. M. WAKUMOTO
Division Head, Compliance
Regional Environmental Department
By direction of
Commander, Navy Region Hawaii

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

RECEIVED
SEP 26 2001
ENGINEERING CONCEPTS

COPY

September 26, 2001

Mr. Ralph Wakumoto
Division Head, Compliance
Regional Environmental Department
Department of the Navy
United States Department of Defense
517 Russell Avenue, Suite 110
Pearl Harbor, Hawaii 96860-4884

Attention: Amana Manoi

Dear Mr. Wakumoto:

Subject: Your Letter of September 7, 2001 Regarding the Draft Environmental Assessment for the Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for reviewing the Board of Water Supply's Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

We acknowledge that you have no comments at this time.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa
for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

United States Department of the Interior

U.S. GEOLOGICAL SURVEY

WATER RESOURCES DISCIPLINE
677 Ala Moana Blvd., Suite 415
Honolulu, Hawaii 96813

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August 23, 2001

Aug 28 2 37 PM '01

Mr. Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843
Attn: Mr. Scot Muraoka

Dear Mr. Muraoka:

Subject: Draft Environmental Assessment (DEA) for
Wahiawa – Whitmore Village 16-Inch Water Main Interconnection
Wahiawa, Oahu, Hawaii
Tax Map Key: 7-1-2:4 & 18; 7-1-3; 7-1-4; and 7-1-10

Thank you for forwarding the subject DEA for review and comment by the staff of the U.S. Geological Survey, Water Resources Discipline, Hawaii District office. We regret however, that due to prior commitments and lack of available staff, we are unable to review this document and are returning it for your future use.

We appreciate the opportunity to participate in the review process.

Sincerely,

Gordon W. Tribble
District Chief

Cc: Ms. Genevieve Salmonson, Director, Office of Environmental Quality Control, 235 South Beretania St., Suite 702, Honolulu, Hawaii 96813
Mr. Kay Muranaka, President, Engineering Concepts, Inc., 1150 south King Street, Suite 700, Honolulu, Hawaii 96814

Enclosure

ENGINEERING CONCEPTS, INC.
Consulting Engineers

U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
HONOLULU, HAWAII
AUG 09 2001
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August 8, 2001

Dear Participant:

Subject: Draft Environmental Assessment (EA) for
Wahiawa - Whitmore Village 16-Inch Water Main Interconnection
Wahiawa, Oahu, Hawaii
TMK: 7-1-2:4 & 18; 7-1-3; 7-1-4; and 7-1-10

The City and County of Honolulu Board of Water Supply is providing you with a copy of the Draft EA for the subject project. The Draft EA was prepared pursuant to the Environmental Impact Statement (EIS) law (Hawaii Revised Statutes, Chapter 343) and the EIS rules (Administrative Rules, Title 11, Chapter 200).

Please review the Draft EA and address your written comments to the proposing agency:

Mr. Clifford S. Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843
Attention: Mr. Scot Muraoka
(phone: 527-5221; fax: 527-5703)

Copies of your comments should also be furnished to the Office of Environmental Quality Control and the project consultant:

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813
(phone: 586-4185; fax: 586-4186)

Mr. Kay Muranaka, President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814
(phone: 591-8820; fax: 591-9010)

The 30-day comment period ends on September 7, 2001. Comments must be received or postmarked by that date.

Thank you for participating in the environmental review process.

1150 South King Street, Suite 700 Honolulu, Hawaii 96814
Tel: (808) 591-8820 Fax: (808) 591-9010 E-Mail Address: eci@gte.net

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

SEP 2 1 2001

ENGINEERING CONCEPTS

September 21, 2001

Mr. Gordon W. Tribble, District Chief
Water Resources Discipline
U.S. Geological Survey
United States Department of the Interior
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

Dear Mr. Tribble:

Subject: Your Letter of August 23, 2001 Regarding the Draft Environmental Assessment for the Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

We acknowledge that you are unable to review the document.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa
for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

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BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

AUG 22 2001

WAYNE H. KIMURA
COMPTROLLER

MARY ALICE EVANS
DEPUTY COMPTROLLER

LETTER NO. (P)1545.1

WE

Aug 24 10 52 AM '01

Mr. Clifford S. Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

Attention: Mr. Scot Muraoka

Dear Mr. Jamile:

Subject: Draft Environmental Assessment (EA) for
Wahiawa - Whitmore Village 16-Inch Water Main Interconnection
Wahiawa, Oahu, Hawaii
TMK: 7-1-2:4 &18; 7-1-3; 7-1-4; and 7-1-10

Thank you for the opportunity to review the subject project's Draft EA. The project does not directly impact any of the Department of Accounting and General Services projects or existing facilities. Therefore, we have no comments to offer.

If there are any questions regarding the above, please have your staff call Mr. Bruce Bennett of the Planning Branch at 586-0491.

Sincerely,

GORDON MATSUOKA
Public Works Administrator

BB:mo
c: Mr. Kay Muranaka, President, Engineering Concepts, Inc.
Ms. Genevieve Salmonson, Director, OEQC

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

JEREMY HARRIS, Mayor

EDDIE FLORES, JR.
CHARLES K. STED
JAN M. L. Y.
HERBERT S. K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

September 21, 2001

Mr. Gordon Matsuoka, Public Works Administrator
Department of Accounting and General Services
State of Hawaii
P. O. Box 119
Honolulu, Hawaii 96810

Attention: Bruce Bennett

Dear Mr. Matsuoka:

Subject: Your Letter of August 22, 2001 Regarding the Draft Environmental Assessment for the Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

We acknowledge that you have no comments to offer.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa

for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

Pure Water . . . our greatest need – use it wisely

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

011378

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RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

EJ 8/14/01 WR

August 10, 2001

Aug 15 7 34 PM '01

Mr. Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Attention: Mr. Scot Muraoka

Dear Mr. Jamile:

Subject: Draft Environmental Assessment (EA) for Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for the opportunity to review the subject application. The Department of Hawaiian Home Lands has no comment to offer.

If you have any questions, please call Mr. Daniel Ornellas at 586-3836.

Aloha,

for Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: Office of Environmental Quality Control
Engineering Concepts, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

RECEIVED
SEP 26 2001
ENGINEERING CONCEPTS

JEREMY HARRIS, Mayor
EDDIE FLORES, JR.
CHARLES A. STED, M.D.
JAN M.L.Y. AHU
HERBERT S.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

September 21, 2001

Mr. Raynard C. Soon, Chairman
Hawaiian Homes Commission
Department of Hawaiian Home Lands
State of Hawaii
P. O. Box 1879
Honolulu, Hawaii 96805

Attention: Daniel Ornellas

Dear Mr. Soon:

Subject: Your Letter of August 10, 2001 Regarding the Draft Environmental Assessment for the Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

We acknowledge that you have no comments to offer.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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GILBERT S. COLOMA-AGARAN
CHAIRPERSON

BRUCE S. ANDERSON
ROBERT G. GIRALD
BRIAN C. NISHIDA
DAVID A. NOBRIGA
HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
DEPUTY DIRECTOR

WR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

AUG 22 2001

AUG 23 10 34 AM '01

Mr. Clifford S. Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Attn: Scott Muraoka

Dear Mr. Jamile:

Draft Environmental Assessment
Wahiawa-Whitmore Village 16-inch Water Main Interconnection,

The Draft Environmental Assessment addresses the requirement for a stream channel alteration permit on pages 1-6. We look forward to processing the permit application for this project.

Thank you for your early coordination regarding the Commission's permit requirements.

If you have any questions regarding this letter please call David Higa at 587-0249.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

c. Ms. Genevieve Salmonson, OEQC
Mr. Kay Muranaka, Engineering Concepts

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
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ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

September 17, 2001

Ms. Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Nishioka:

Subject: Your Letter of August 22, 2001 Regarding the Draft Environmental Assessment for the Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

A Stream Channel Alteration Permit Application will be submitted for your review and approval prior to any construction activities within Kaukonahua Stream.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

Pure Water . . . our greatest need – use it wisely

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

WR-168/ 01

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DEPUTIES
JANET E. KAWELO
LINNEL NISHIOKA

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kekuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
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STATE PARKS

01 SEP 28 AM 10

September 17, 2001

Mr. Clifford S.Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843
Attention: Mr. Scott Muraoka

LOG NO: 28159
DOC NO: 0109EJ06

Oct 1 11 05 AM '01

Dear Mr. Jamile:

SUBJECT: Chapter 6E-8 Historic Preservation Review- Draft Environmental Assessment (DEA) for Wahiawa- Whitmore Village 16-inch Water Main Interconnection Wahiawa, Wahiawa, O`ahu
TMK: 7-1-002:004, 018; 7-1-003; 7-1-004; 7-1-010

Thank you for the opportunity to comment on the DEA for the proposed Wahiawa- Whitmore village 16-inch Water Main Interconnection. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the project areas.

A review of our records shows that there are no known historic sites along the currently proposed interconnection corridor (Kaala Avenue, Clark Street, under Wahiawa Reservoir, Uwalu Circle, Circle Makai St. and Nani Ihi Ave.) portion of Kaukonahua stream. An archaeological assessment of this corridor was conducted; no historic sites were found. Based on the assessment no sites are likely to be found within this corridor, because of the steep slopes and the evidence for modern human intrusion. Therefore we believe that this project will have "no effect" on significant historic sites.

Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

EJ:jk

c: Ms. Genevieve Salmonson, Director, OEQC, 235 S. Beretania St. Suite 702, Honolulu, HI 96813
Mr. Kay Muranaka, President, Engineering Concepts, Inc. 1150 South King Street, Suite 700 Honolulu, Hawaii 96814

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

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JEREMY HARRIS, Mayor

EDDIE FLORES, JR., Chairman
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HERBERT S.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

October 5, 2001

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
Kekuhihewa Building, Room 566
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

Subject: Your Letter of September 17, 2001 Regarding the Draft Environmental Assessment for the Board of Water Supply's Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main interconnection project.

We acknowledge that the proposed project should have "no effect" on any significant historic sites. Based on the archaeological assessment that was conducted, no sites are likely to be found within the project corridor because of the steep slopes and the evidence of modern human intrusion.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa
for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Ken Ishizaki, Engineering Concepts, Inc.

BENJAMIN J. CAYETANO
GOVERNOR

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STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

GENEVIEVE SALMONSON
DIRECTOR

011325
WR

September 4, 2001

Mr. Clifford Jamile, Manager and Chief Engineer
Board of Water Supply, City and County of Honolulu
630 South Beretania Street
Honolulu, Hawai'i 96843

Dear Mr. Jamile:

Subject: Draft EA for the Wahiawa-Whitmore 16 Inch Water Main Interconnection, O'ahu

Thank you for the opportunity to review the subject document. We have the following comments.

1. Please consider the alternative of using the Navy's water system as a backup for Whitmore Village.

2. Please describe whether any wetland areas would be impacted by the project.

3. What is the likelihood of piles being driven to support the water main? What are the noise impacts and mitigation measures associated with driving piles in this area?

4. What is the likelihood of contaminated stream water infiltrating the pipes that will be placed in Kaukonahua Stream? What are possible mitigation measures to prevent the public from drinking water that may be contaminated by the stream water infiltration? Will these mitigation measures be implemented?

Should you have any questions, please call Jeyan Thirugnanam at 586-4185. Mahalo.

Sincerely,

Genevieve Salmonson
Director

c: Engineering Concepts, Inc.

SEP 11 11 35 AM '01

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

November 19, 2001

Ms. Genevieve Salmonson
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Your Letter of September 4, 2001 Regarding the Draft Environmental Assessment for the Board of Water Supply's Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii, TMK: 7-1-2: 4 and 18; 7-1-3; 7-1-4; and 7-1-10

Thank you for your letter regarding the Draft Environmental Assessment (EA) for the proposed project.

We provide the following response to your comments:

1. *Please consider the alternative of using the Navy's water system as a backup for Whitmore Village.*

   The alternative of using the Navy's water system as a backup for Whitmore Village was evaluated. Based on the analysis, approximately 5,000 linear feet of water main would be required from the Whitmore Village area to the Navy's NAVCAMS Eastpac water system as compared to 3,200 linear feet for the preferred alignment. In addition, since the Navy system operates at a higher elevation than the Whitmore Village system, a Pressure Reducing Valve would be required. Due to the higher construction costs, lack of information on available system capacity and the Navy's inability to share in the cost, this alternative was discounted.

2. *Please describe whether any wetland areas would be impacted.*

   As referenced in the "The Botanical Resources Assessment" in Appendix B of the Draft EA, the proposed alignment of the water main does not traverse any wetland areas.

3. *What is the likelihood of piles being driven to support the water main? What are the noise impacts and mitigation measures associated with driving piles in this area?*

   Pile driving will not be necessary for the proposed project since piles are not needed to support the water main. The water main will be designed with flexible ball joints that will be laid on the stream bed.

4. *What is the likelihood of contaminated stream water infiltrating the pipes that will be placed in Kaukonahua Stream? What are possible mitigation measures to prevent the public from drinking water that may be contaminated by the stream water infiltration? Will these mitigation measures be implemented?*

   Stream water from Kaukonahua Stream will not infiltrate into the water main. At the stream crossing, the use of ductile iron ball joint pipe is proposed which is water-tight and impermeable. Ball joint pipe provides a strong, flexible joint without the use of bolts that is well suited for underwater installations. Use of ball joint pipe would also allow the water main to rest on the stream bottom, eliminating the need to trench within the stream.

If you have any questions, please call Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa

for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Genevieve Salmonson, Office of Environmental Quality Control
Kay Muranaka, Engineering Concepts, Inc.

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PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

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September 6, 2001

Mr. Clifford S. Jamile
Manager and Chief Engineer
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

ATTN: Mr. Scot Muraoka

Subject: Wahiawa – Whitmore Village 16-inch Water Main Interconnection – DEA

Dear Mr. Jamile:

Thank you for the opportunity of commenting on the above referenced project, which would provide a 16-inch water main connection between Wahaiwa and Whitmore Village. OHA has the following comments:

Under Archaeological and Historic Resources on pages 1-4 and 4-3 there should be an amendment to reflect that the State Historic Preservation Office and the Oahu Island Burial Council must be contacted if inadvertent discoveries are made during construction.

While Cultural Surveys Hawaii, Inc. states that the proposed project is not anticipated to impact archaeological and historic resources, discussion with Native Hawaiians familiar with Lihue, Wahiawa and Holman suggest that there are additional cultural and historic sites within the area. We recommend the use of Alternatives 1 or 2 because they each make use of existing Honolulu City and County easements while Alternative 3 will require extensive excavation. Should Alternate 3 be selected, we request that Archaeological Monitoring Plan and Cultural Monitor be used.

If you have any questions, please contact Jerry B. Norris at 594-1847.

Sincerely,

Colin C. Kippen Jr.

Colin C. Kippen, Jr.
Deputy Administrator
Hawaiian Rights Division

cc: OHA Board of Trustees
Clyde Namu'o
Genevieve Salmonson, OEQC
Kay Muranaka, Engineering Concepts, Inc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

February 19, 2002

Mr. Colin C. Kippen, Jr.
Deputy Administrator
Hawaiian Rights Division
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Kippen:

Subject: Your Letter of September 6, 2001 Regarding the Draft Environmental Assessment for the Board of Water Supply's Proposed Wahiawa - Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii, TMK: 7-1-2:4 & 18; 7-1-3; 7-1-4; and 7-1-10

Thank you for your letter regarding the Draft Environmental Assessment (EA) for the proposed project. We offer the following response to your request that all work be done within the City-owned easements due to your concerns of the historical importance and cultural significance of the land areas in the project vicinity.

1. ***Under Archaeological and Historic Resources on pages 1-4 and 4-3 there should be an amendment to reflect that the State Historic Preservation Office and the Oahu Island Burial Council must be contacted if inadvertent discoveries are made during the construction.***

   The Final EA will be modified to state that both the State Historic Preservation Office and the Oahu Island Burial Council will be contacted upon inadvertent discoveries made during construction.

2. ***While Cultural Surveys, Inc. states that the proposed project is not anticipated to impact archaeological and historic resources, discussion with Native Hawaiian familiar with Lihue, Wahiawa, and Holman suggest that there are additional cultural and historic sites within the area. We recommend the use of Alternatives 1 or 2 because they each make use of existing Honolulu City and County easements while Alternative 3 will require extensive excavation. Should Alternative 3 be selected, we request that Archaeological Monitoring Plan and Cultural Monitor be used.***

1) An indication that traditional Hawaiian practices and beliefs occur or have occurred in an area is evidence of archaeological, historical, and botanical resources. The following paragraphs outline information gathered through fieldwork and assessments.

   a. Archaeological Assessment

   Cultural Surveys, Inc. performed an archaeological assessment on the proposed waterline route. The report, dated May 2000, provided a documentary of development in the Wahiawa area. In traditional Hawaiian times, Wahiawa was thought to have a sacred birthing site. Through the early eighteen hundreds, Wahiawa served as the primary location for the Hawaiian chiefs to harvest sandalwood and export these trees to the Orient. With the overthrow of the Hawaiian monarchy and the increase in agricultural interests, Wahiawa, developed into homestead and agricultural lands including the area along the proposed water line route (see attached map). The areas on the northeast end of the proposed waterline route were transformed into pineapple fields. During this period, the Kaukonahua Stream was also altered to meet the needs of Waialua Sugar Company. Thus, the Wahiawa Dam and Reservoir was built along the Kaukonahua Stream to provide irrigation. The Wahiawa Dam and Reservoir still exists today for flood control and storm water storage.

   In addition to this documentary of how Wahiawa developed, Cultural Surveys, Inc., performed a field survey of the proposed water line route. No surface archaeological sites were observed on any portion of the proposed water main alignment. Both ends of the proposed alignment will be constructed within asphalt-paved roads through residential areas. The gulch that slopes down to the reservoir is steep and has been heavily impacted by human intrusion, as evidenced by modern trash. There is no evidence of traditional Hawaiian activity observed on the grassy bank of the reservoir. It is likely that the rising waters of the reservoir would have destroyed traditional taro lo`i terracing or features associated with the former free-flowing stream.

   Paul Rosendahl, Ph.D., Inc. conducted a previous archaeological investigation in the area in 1992. No archaeological sites or subsurface deposits were uncovered during this survey in the general vicinity of the proposed water line route or along the reservoir banks. This study did notice the large amount of human disturbance: trash and former campsites on the riverbanks.

b. Botanical Resources Assessment
A botanical resources assessment was conducted by Char & Associates in May 2000. The field survey performed along the proposed water line route did not provide evidence of any endangered or threatened species or species of concern. The assessment stated, "All of the plants can be found in similar environmental habitats throughout the Hawaiian Islands." In addition, the assessment concluded that the proposed water line work would not produce a significant negative impact on the botanical resources or affect any wetlands.

State Historic Preservation Division

The State Historic Preservation Division has also reviewed the Draft Environmental Assessment for the proposed water line alignment and responded in a letter dated September 17, 2001 (see attachment). Based upon their review of historic reports, maps, aerial photographs, and Cultural Surveys, Inc.'s archaeological assessment, there are no known historic sites along the proposed water line route. In addition, the project is believed to have "no effect" on historic sites. Therefore, an archaeological monitoring plan and cultural monitor are not warranted.

Cultural Impact Summary

Although historical documentation has indicated the significance of Lo-ali'i, Lihue Wahiawa and Helemano in traditional times for the Native Hawaiians, agricultural activity during the early twentieth century would have impacted the land including all portions of the proposed water line. These assessments have determined that the proposed project will not have a significant effect on any archaeological, historical, and botanical resources. Further, the pipeline will not diminish or impact stream flow or aquatic resources. Thus, the proposed project is not anticipated to significantly affect cultural resources and traditional gathering practices of the Native Hawaiians.

2) *We note your request that all work be done within existing easements described in Alternatives 1 and 2. The following is a brief summary of the three alternatives as well as the preferred alignment that were evaluated:*

The Preferred Alignment vs. The Alternative Alignments

The preferred route is approximately 3,200 linear feet (l.f.) and traverses within the existing right-of-ways of Kellog Street, Kaala Avenue, and Clark Street in Wahiawa; and Uwalu Circle, Circle Makai Street, Nani Ihi Avenue and Whitmore Avenue in Whitmore Village.

The preferred alignment extends approximately 1,400 l.f. beyond the existing right of ways and crosses Wahiawa Reservoir along the North Fork of Kaukonahua Stream between Clark Street in Wahiawa and Uwalu Circle in Whitmore Village. This alternative was chosen over the other alternatives based on the following:

- *Alternative 1: Along California Avenue, Mango Street, Kilani Avenue, Kamehameha Highway and Whitmore Village:*

Disadvantages-

- *This is the longest alignment at approximately 12,300 l.f. with an estimated construction time of 23-29 months.*
- *Requires a Conservation District Use Permit.*
- *The main would cross the Wahiawa Reservoir by either hanging on Karston Thot Bridge or from a separate supporting structure next to it. (Note: Karston Thot bridge is eligible for both National and Hawaii Register of Historic Places.)*
- *Alternative 2: Along Kilani Avenue, Kamehameha Highway, and Whitmore Avenue:*

Disadvantages-

- *The length of alignment is approximately 11,600 l.f. with an estimated construction time of 21 to 27 months.*
- *Requires a Conservation District Use Permit.*
- *Kilani Avenue is crowded with existing utilities. If the main should break, it may affect other utilities.*

- **Alternative 3:** Along Kellog Street from the Kaala Avenue intersection, crossing the gulch and reservoir and connecting to existing Wahiawa-Whitmore Village Water main:

Disadvantages-

- *The length of alignment is approximately 1,800 l.f. longer than the preferred alternative and would parallel the existing main.*
- *Approximately 100,000 sq.ft .of easement would need to be granted.*
- *If the water mains are too close, they may be susceptible to damage should the other main break.*

Alignment Summary

Alternatives 1 and 2 are approximately 4 times the length of the preferred alignment incurring as much as $4,000,000 more in construction costs.

Alternative 3, parallel to the existing main, is possible if the mains are sufficiently separated, but would add approximately $800,000 more. Installing the main within public right-of-ways rather than cross-country is much too costly. The cross-country alignment is less expensive and will not significantly impact cultural and archaeological resources. Therefore, we maintain our preferred alignment alternative to provide reliable water service and fire protection to Whitmore Village at reasonable costs.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa

for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Genevieve Salmonson, Office of Environmental Quality Control
Kay Muranaka, Engineering Concepts, Inc.

011451

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.co.honolulu.hi.us

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JEREMY HARRIS
MAYOR

RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

WWDE.P 01-325

Aug 24 10 53 AM '01

August 21, 2001

MEMORANDUM

TO: MR. CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: for RAE M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR
WAHIAWA – WHITMORE VILLAGE 16-INCH WATER MAIN
INTERCONNECTION
WAHIAWA, OAHU, HAWAII
TMK: 7-1-2:4 & 18; 7-1-3; 7-1-4; AND 7-1-10

We have reviewed the subject Draft EA and have no comments to offer at this time. We note that City Departments of Environmental Services, Facility Maintenance, Parks and Recreation, Planning and Permitting and Transportation Services were provided a copy of the Draft EA for their review and comments.

If there are any questions, please call Bill Liu of the Wastewater Design and Engineering Division at 527-6871.

cc: Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Mr. Kay Muranaka, President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

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JEREMY HARRIS, Mayor

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CHARLES A. STED, Vice-Chairman
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BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

September 28, 2001

TO: RAE M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: BL for CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER

SUBJECT: YOUR MEMORANDUM OF AUGUST 21, 2001 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAHIAWA-WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU, HAWAII

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

We acknowledge that you have no comments to offer.

If you have any questions, please contact Scot Muraoka at 527-5221.

cc: Engineering Concepts, Inc.

DEPARTMENT OF PARKS AND RECREATION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4182 • FAX: 527-5725 • INTERNET: www.co.honolulu.hi.us

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cc 10/5/01 WR

JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SKIPPA" DIAZ
DEPUTY DIRECTOR

01 OCT 5 A8:53 AM

October 1, 2001

MEMORANDUM

TO: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: WILLIAM D. BALFOUR, JR., DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR WAHIAWA - WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU, HAWAII
TMK: 7-1-2:4 & 18; 7-1-3; 7-1-4; AND 7-1-10

Thank you for the opportunity to review and comment on the Draft Environmental Assessment relating to the Wahiawa - Whitmore Village 16-inch Water Main Interconnection.

The Department of Parks and Recreation supports the development of the proposed interconnection; but as our facilities and services will not be impacted by the project, we request that we be deleted as a consulted party to the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 547-7396.

for WILLIAM D. BALFOUR, JR.
Director

WDB:cu (3163)

cc: Ms. Genevieve Salmonson, OEQC
Mr. Kay Muranaka, Engineering Concepts, Inc.
Mr. Don Griffin, Department of Design and Construction

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

JEREMY HARRIS, Mayor

EDDIE FLORES, Jr.
CHARLES A. STED, Vice-Chair
JAN M.L.Y. AHU
HERBERT S.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

October 12, 2001

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OCT 17 2001
ENGINEERING CONCEPTS

TO: WILLIAM D. BALFOUR, JR., DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM: for CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER

SUBJECT: YOUR MEMORANDUM OF OCTOBER 1, 2001 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLY'S PROPOSED WAHIAWA-WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main interconnection project.

We acknowledge that the Department of Parks and Recreation supports the development of the proposed project. As requested, your agency will be deleted as a consulted party since your facilities and services will not be impacted by the project.

If you have any questions, please contact Scot Muraoka at 527-5221.

cc: Ken Ishizaki, Engineering Concepts, Inc.

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.co.honolulu.hi.us

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cc/Env.
10/5/01 WR

JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

2001/CLOG-3412 (RS)

OCT 5 2 12 PM '01

September 6, 2001

TO: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTN: SCOT MURAOKA

FROM: RANDALL K. FUJIKI, AIA, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

SUBJECT: DEA FOR THE WAHIAWA - WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION
TMK: 7-1-2: 4 & 18; 7-1-3; 7-1-4; AND 7-1-10

Thank you for the opportunity to review the July 2001 Draft Environmental Assessment ("DEA") prepared by Engineering Concepts, Inc. for the Board of Water Supply.

We offer the following comments:

1. We recommend adding a new section to Chapter 6. Findings and Anticipated Determination to address how the proposed project is consistent with some of the following provisions:

   - The Objectives and Policies of the City's *General Plan (1992)*, especially Policy 1 ("Develop and maintain an adequate supply of water for both residents and visitors."), Objective B of Chapter V. Transportation and Utilities on page 27.

   - The *Development Plan Common Provisions* (Chapter 24, Article 1), Sec. 24-1.9 states that "Priority shall be given to proposals that will correct deficiencies in public facilities ... with the following policies:": subsection (1)(A) on page 24 states that "First priority shall be given in the programming of capital improvements to those public facility projects that (A) will improve or replace existing public facilities in unsound condition; ..."

   - The *Development Plan Special Provisions for Central Oahu*, Article 5, Part I: Article 5. Section 24-5-5.3(a) on page 5-8 on development priorities states that "... public plans and programs in Central Oahu shall provide for projects in the priority shown. (a) Public facilities improvements, i.e., ..., and potable water."

2. Please add the following to Table 1-1 (Permits and Approvals) on page 1-6: that DPP will need to approve the Subdivision Application to create the easements.

4. Page 4-2, second paragraph: clearing and grubbing will be conducted in accordance with Chapter 14 of the Revised Ordinances of Honolulu, dated 1990 instead of Chapter 23 ROH, 1978, as cited (call Don Fujii of DPP's Civil Engineering Project Review Section at 527-7320).

5. Based on our review of the BWS July 1, 2001 to June 30, 2007 Six Year Capital Improvement Program ("CIP"), the proposed parallel transmission water main is determined to be a "replacement in kind and location" and a "minor" project which will not require an amendment to the Central Oahu Development Plan Public Facilities Map ("CO DPPFM") prior to appropriation and expenditure of land acquisition or construction funds.

6. The Draft Central Oahu *Sustainable* Communities Plan, is currently being finalized for transmittal to the Planning Commission and City Council for adoption. When it is adopted, a Public Infrastructure Map ("PIM") will be prepared for Central Oahu. Since water lines are not a type of project to be shown on the PIM, a PIM amendment will not be required for the proposed project.

   You may call the CO SCP project manager Bob Stanfield at extension 6094 for an update on the status of the adoption and to obtain a copy of the Draft Report.

7. Please be aware of the municipal sewer lines, laterals, and force main that run along Kaala Avenue, Uwalu Circle, Circle Makai, and Nani Ihi Avenue (see attached maps and call Scott Gushi of DPP's Wastewater Branch at 523-4886).

Please call Ray Sakai of my staff at extension 4047 if you have any questions.

Attachments

cc: Kay Muranaka, President, Engineering Concepts, Inc.
Genevieve Salmonson, Director, OEQC

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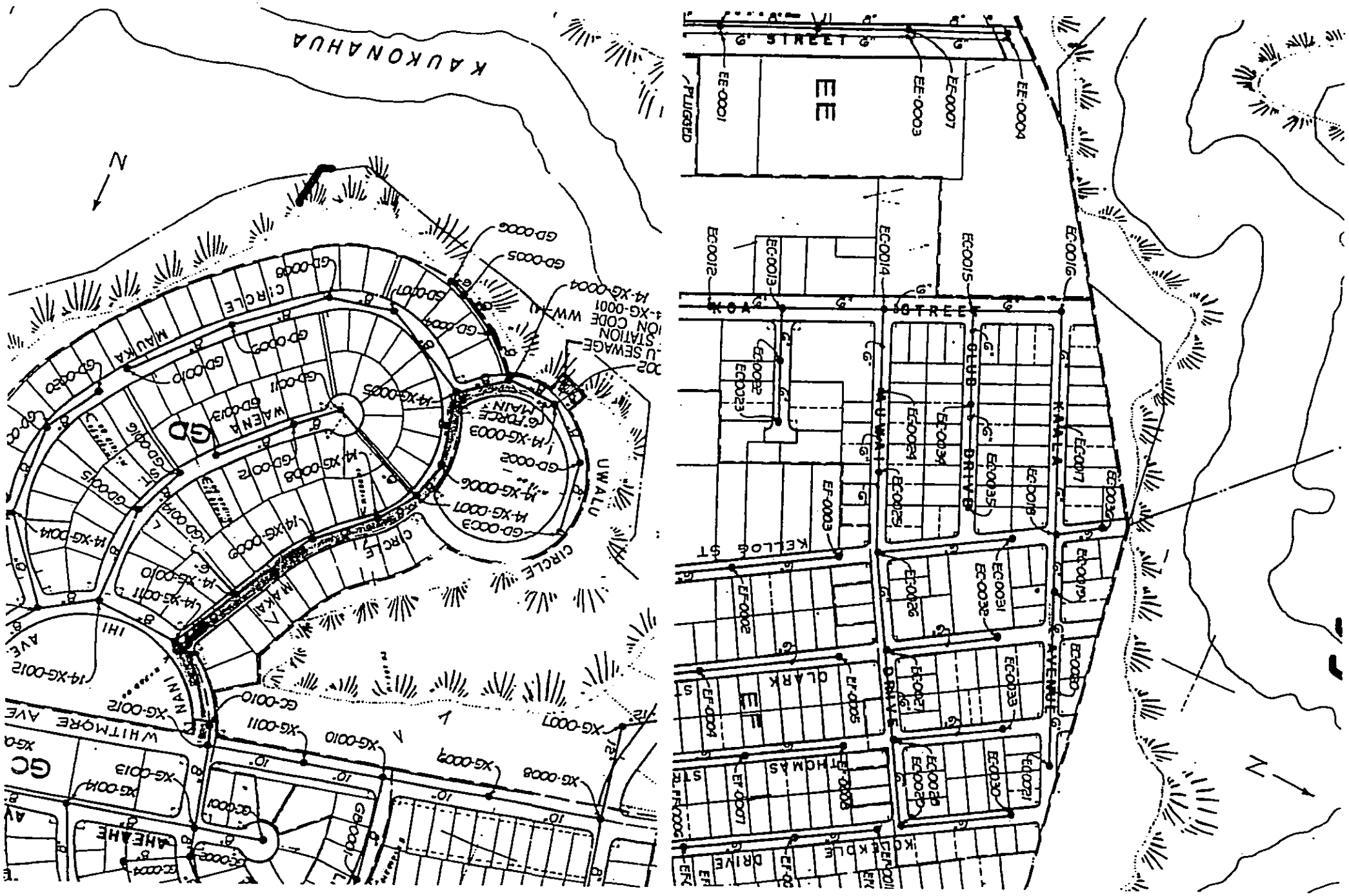

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BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

October 17, 2001

TO: RANDALL K. FUJIKI, AIA, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

ATTN: RAY SAKAI

FROM: BU for CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER

SUBJECT: YOUR MEMORANDUM OF SEPTEMBER 6, 2001 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLY'S PROPOSED WAHIAWA-WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU, HAWAII, TMK: 7-1-2: 4 AND 18; 7-1-3; 7-1-4; AND 7-1-10

Thank you for your memorandum [(reference: 2001/CLOG-3412 (RS)] regarding the Draft Environmental Assessment (EA) for the proposed project.

We provide the following response to your comments:

1. Chapter 6 of the Final EA will be expanded to evaluate the proposed project with respect to the City and County of Honolulu's General Plan, Development Plan Common Provisions and Development Plan Special Provisions for Central Oahu.

2. Table 1-1 on page 1-6 will indicate that the Department of Planning and Permitting (DPP) will need to approve the Subdivision Application to create the easements.

3. The Final EA will be revised to indicate that clearing and grubbing will be conducted in accordance with Chapter 14, "Grading, Soil Erosion, and Sediment Control," of the Revised Ordinances of Honolulu, 1990, as amended.

4. We acknowledge that the proposed project does not require an amendment to the Central Oahu Development Plan Public Facilities Map prior to appropriation and expenditure of land acquisition or construction funds.

5. Upon the adoption of the Central Oahu Sustainable Communities Plan, we understand that a Public Infrastructure Map amendment will not be required for the proposed water main project.

6. The construction plans for the proposed project will be coordinated to avoid potential conflicts with the existing municipal sewer facilities.

If you have any questions, please contact Scot Muraoka at 527-5221.

cc: Genevieve Salmonson, Office of Environmental Quality Control
Kay Muranaka, Engineering Concepts, Inc.

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA • 711 KAPIOLANI BOULEVARD SUITE 1200 • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4529 • FAX: (808) 523-4730 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

CHERYL D. SOON
DIRECTOR

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

September 6, 2001

TPD8/01-03490R

MEMORANDUM

TO: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTN: SCOT MURAOKA

FROM: CHERYL D. SOON, DIRECTOR

SUBJECT: WAHIAWA-WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION

In response to the August 8, 2001 letter from Engineering Concepts, Inc., the draft environmental assessment (EA) for the subject project was reviewed. The following comments are the result of this review:

1. We concur with the statements on Pages 1-4 and 4-4 of the draft EA that the subject project should not have any long-term adverse area traffic impact.

2. In its discussion of traffic impacts, Section 4.12 (Page 4-4) of the draft EA should address the following:

   - Area residents, the Wahiawa Neighborhood Board, and any other area community associations, etc., should be informed of the proposed waterline work and its expected traffic impact (proposed detours, lane closures, etc.) before initiation of the construction work. The emergency services (fire, ambulance, and police) and Oahu Transit Services, Inc. also should be apprised of any impending construction work. Although there are no bus stops on Nani Ihi Avenue, Circle Makai Street or Kaala Avenue, bus service is provided on Whitmore Avenue. Also, residents on Circle Makai Street rely on TheHandi-Van for their public transit needs.

   - The provision of adequate area for the parking of construction vehicles, storage of materials, etc., during the construction phase should be addressed to avoid illegal parking on unimproved sidewalk areas and to ensure pedestrian safety in and around all work areas.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at Local 6976.

CHERYL D. SOON

cc: Ms. Genevieve Salmonson
Office of Environmental Quality Control

Mr. Kay Muranaka
Engineering Concepts, Inc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

November 27, 2001

TO: CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

ATTN: FAITH MIYAMOTO

FROM: BU for CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER

SUBJECT: YOUR MEMORANDUM OF SEPTEMBER 6, 2001 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLY'S PROPOSED WAHIAWA-WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU, HAWAII, TMK: 7-1-2: 4 AND 18; 7-1-3; 7-1-4; AND 7-1-10

Thank you for your memorandum (reference: TPD8/01-03490R) regarding the Draft Environmental Assessment (EA) for the proposed project.

We have the following response to your comments:

1. Construction Impacts to Traffic:

   Section 4.12 on Traffic will indicate that the Board of Water Supply (BWS) will inform the Wahiawa Neighborhood Board and area residents prior to any construction activities.

   The traffic control plan will indicate any required street closures and detours. The contractor will be required to notify the emergency services, DTS and the handi-Van of any planned or unforeseen closures and detours and the associated scheduling.

2. Temporary Construction Yards and Equipment Staging areas:

   The contract documents will require the Contractor to maintain a storage yard for construction materials and vehicles at a legally designated site which will minimize illegal parking and ensure pedestrian safety.

If you have any questions, please contact Scot Muraoka at 527-5221.

cc: Genevieve Salmonson, Office of Environmental Quality Control
Debra Ikeno, Engineering Concepts, Inc.

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET, SUITE H425 • HONOLULU, HAWAII 96819-1869
TELEPHONE (808) 831-7761 • FAX (808) 831-7750 • INTERNET: www.co.honolulu.hi.us

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JEREMY HARRIS
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

August 24, 2001

AUG 28 2 35 PM '01

TO: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTN: SCOT MURAOKA

FROM: JOHN CLARK, ACTING FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR WAHIAWA - WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION WAHIAWA, OAHU, HAWAII
TAX MAP KEY: 7-1-002: 004 AND 018; 7-1-003; 7-1-004, AND 7-1-010

We are commenting on a letter from Engineering Concepts, Inc., dated August 8, 2001, regarding the above-mentioned project.

The Honolulu Fire Department requests that you comply with the following:

1. Maintain fire apparatus access throughout the construction site for the duration of the project.

2. Notify the Fire Communication Center (523-4411) regarding any interruption in the existing fire hydrant system during the project.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

JOHN CLARK
Acting Fire Chief

JC/SK:jo

cc: Genevieve Salmonson, Director, Office of Environmental Quality Control
Kay Muranaka, President, Engineering Concepts, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

JEREMY HARRIS, Mayor
EDDIE FLORES, JR., Chairman
CHARLES A. STEELE, Vice Chairman
JAN M.L.Y. AMI
HERBERT B.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

October 18, 2001

RECEIVED
OCT 26 2001
ENGINEERING CONCEPTS

TO: JOHN CLARK, ACTING FIRE CHIEF
HONOLULU FIRE DEPARTMENT

ATTN: BATTALION CHIEF KENNETH SILVA

FROM: for CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER

SUBJECT: YOUR MEMORANDUM OF AUGUST 24, 2001 ON THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAHIAWA-WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU, HAWAII, TMK: 7-1-2: 4 AND 18, 7-1-3; 7-1-4, AND 7-1-10

Thank you for your memorandum regarding the Draft Environmental Assessment (EA) for the proposed project.

We have the following responses to your comments:

1. Fire apparatus access will be maintained throughout the construction site for the duration of the project.

2. The Fire Communication Center will be notified if any interruptions in water service occur to the existing fire hydrant system during the project duration.

If you have any questions, please contact Scot Muraoka at 527-5221.

cc: Engineering Concepts, Inc.

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
http://www.honolulupd.org
www.co.honolulu.hi.us

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WR

JEREMY HARRIS
MAYOR

LEE D. DONOHUE
CHIEF

MICHAEL CARVALHO
ROBERT AU
DEPUTY CHIEFS

OUR REFERENCE CS-DL

August 24, 2001

AUG 31 10 04 AM '01

TO: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: LEE D. DONOHUE, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR WAHIAWA – WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU, HAWAII, TMK: 7-1-2:4 AND 18: 7-1-3; 7-1-4; AND 7-1-10

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Wahiawa – Whitmore Village 16-Inch Water Main Interconnection project.

This project will not have an impact on the services provided by the Honolulu Police Department after it is completed. However, we will anticipate an overall impact on traffic during its construction phase, especially when work is being conducted at Whitmore Avenue. We would like to recommend that the contractor call Lieutenant Brian Chang of District 2 (Wahiawa) at 622-2179 to review the traffic plans after they have been completed.

If there are any questions, please call Ms. Carol Sodetani of the Support Services Bureau at 529-3658.

LEE D. DONOHUE
Chief of Police

By [signature]
EUGENE UEMURA
Assistant Chief of Police
Support Services Bureau

cc: Ms. Genevieve Salmonson, OEQC

Mr. Kay Muranaka, Engineering Concepts, Inc.

Serving and Protecting with Aloha

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

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OCT 26 2001
ENGINEERING CONCEPTS

October 19, 2001

TO: LEE D. DONOHUE, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

ATTN: CAROL SODETANI

FROM: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER

SUBJECT: YOUR MEMORANDUM OF AUGUST 24, 2001 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLY'S PROPOSED WAHIAWA-WHITMORE VILLAGE 16-INCH WATER MAIN INTERCONNECTION, WAHIAWA, OAHU, HAWAII, TMK: 7-1-2: 4 AND 18; 7-1-3; 7-1-4; AND 7-1-10

Thank you for your memorandum regarding the Draft Environmental Assessment for the proposed project.

We have the following response to your comments:

1. Traffic impacts during construction activities will be mitigated through an approved traffic control plan.
2. We acknowledge that Lieutenant Brian Chang of District 2 (Wahiawa) should be contacted to review the traffic plans after they have been completed.

If you have any questions, please contact Scot Muraoka at 527-5221.

cc: Engineering Concepts, Inc.

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verizon

Verizon Hawaii Inc.
P.O. Box 2200
Honolulu, HI 96841

August 13, 2001

Mr. Clifford S. Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Attention: Mr. Scot Muraoka

Subject: Draft Environmental Assessment (EA) for Wahiawa-Whitmore Village 16" Water Main Interconnection. Wahiawa, Oahu, Hawaii.

Dear Sir:

Thank you for the opportunity to review the above subject Draft Environmental Assessment. Verizon Hawaii Inc. has existing telephone facilities located within the project area. However, we do not foresee any conflicts with the proposed route for the water main. Please submit the detailed construction plans for our review and comment.

Should you have any questions, please call Garret Hayashi at 840-1438.

Sincerely,

Jill Z. Lee
Section Manager - OSP Engineering

cc: Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Mr. Kay Muranaka, President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

File (Wahiawa)

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BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

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JAN M. L.Y. [illegible]
HERBERT S.K. KAOPUA, III
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

September 17, 2001

Ms. Jill Z. Lee, Manager
OSP Engineering
Verizon Hawaii, Inc.
P. O. Box 2200
Honolulu, Hawaii 96841

Attention: Garrett Hayashi

Dear Ms. Lee:

Subject: Your Letter of August 13, 2001 Regarding the Draft Environmental Assessment for the Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

We acknowledge that Verizon Hawaii does not foresee any conflicts with the proposed water main route. In addition, the construction plans will be submitted for your review upon availability.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa
for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

RECEIVED

Transmittal

Oceanic

200 Akamainui Street • Mililani HI 96789
(808) 625 - 2100

Date: August 14, 2001

RE: PROJECT LOCATION/WORK ORDER

To: Board of Water Supply
City and County of Honolulu
630 South Beretania St
Honolulu, HI 96843

Attention: Mr. Clifford S. Jamile

Draft Environmental Assessment for
Wahiawa – Whitmore 16" water main

GENTLEMEN: We are sending you the following:

- ☐ Pole / Conduit Application
- ☐ Permit Applications
- ☐ Copy of Letter
- ☐ Preliminary / Final Drawings
- ☐ Return Prints
- ☐ Other

Copies	Sht / Appl. #	Description
1		site map

The Above is transmitted:

- ☐ For Your Approval
- ☐ For Review and Comment
- ☐ For Your Use / Records
- ☒ As Requested
- ☐ As Approved
- ☐ Other

Comments / Remarks: Oceanic has reviewed the plans for the proposed action and also the alternate plans.
If any questions, please call 625-8456 and reference number E-3366.

CC: E-3366
KAY MURANAKA
MS GENEVIEVE SALMONSON

Signed: Dean Yonezawa
Title: Designer (Dean Yonezawa)

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

JEREMY HARRIS, Mayor
EDDIE FLORES, JR., Chairman
CHARLES A. SYKES, Vice-Chairman
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HERBERT S.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

December 12, 2001

Mr. Dean Yonezawa
Oceanic Cablevision
200 Akamainui Street
Mililani, Hawaii 96789

Dear Mr. Yonezawa:

Subject: Your Letter of August 14, 2001 Regarding the Draft Environmental Assessment for the Board of Water Supply's Proposed Wahiawa - Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii, TMK: 7-1-2: 4 and 18; 7-1-3; 7-1-4; and 7-1-10

Thank you for your letter (reference: E-3366) and cable site map regarding the Draft Environmental Assessment for the proposed project.

We acknowledge that Oceanic Cablevision has overhead facilities on Kellog Street and Kaala Avenue. The design of the proposed water main will be coordinated with Oceanic Cablevision to prevent potential conflicts with these cable facilities.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa

for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Genevieve Salmonson, Office of Environmental Quality Control
Kay Muranaka, Engineering Concepts, Inc.

Pls. log & Route.

WR-157/01 S 8/2

THE GAS COMPANY

August 22, 2001

Mr. Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Attention: Mr. Scot Muraoka

Gentlemen:

Subject: Draft Environmental Assessment (EA) for
Wahiawa – Whitmore Village 16-Inch Water Main Interconnection
Wahiawa, Oahu, Hawaii
TMK: 7-1-2:4 & 18; 7-1-3; 7-1-4; and 7-1-10

Please be advised that The Gas Company maintains underground utility gas mains in the project vicinity, which serves commercial and residential customers in the area and is interconnected with the utility network in Wahiawa. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area.

Thank you for the opportunity to comment on the Draft Environmental Assessment. Should there be any questions, or if additional information is desired, please contact Chris Anderson at 594-5564.

Sincerely,

The Gas Company

Charles E. Calvet, P.E.
Manager, Engineering

CEC:krs
01-178

cc: Ms. Genevieve Salmonson, Office of Environmental Quality Control
Mr. Kay Muranaka, Engineering Concepts, Inc.

Water Resources

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

JEREMY HARRIS Mayor
EDOE [illegible]
CHARLES A. [illegible]
JAN M. L. [illegible]
HERBERT S. K. KAOPUA, SR.
BARBARA KIM STANTON
BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio
CLIFFORD S. JAMILE
Manager and Chief Engineer

COPY

September 17, 2001

Mr. Charles E. Calvet, P.E., Manager
Engineering
The Gas Company
P. O. Box 3000
Honolulu, Hawaii 96802-3000

Dear Mr. Calvet:

Subject: Your Letter of August 22, 2001 Regarding the Draft Environmental Assessment for the Proposed Wahiawa-Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment for the proposed Wahiawa-Whitmore Village 16-inch water main project.

We acknowledge that The Gas Company maintains underground utility gas mains in the project vicinity. Therefore, the construction plans will be submitted for your review to minimize any potential conflicts with existing gas facilities in the project area.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

Barry Usagawa
for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

WR-158/01

cc: Estelle. Pls. log & route for Response - S 9/4

ROAD DIVISION - WAIANAE
86-220 FARRINGTON HWY
WAIANAE, HI 96792

FACSIMILE TRANSMITTAL

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TO: Scott Muraoka FAX NO.: 527-5703

FROM: Tom Lenchanko FAX NO.: 696-2568

DATE: 9/4/01

TOTAL PAGES INCLUDING THIS SHEET: 2

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REMARKS: 16" Water Main Whitmore Village

TL 9/4/01

AUG 35 1 05 PM '01

Thomas J. Lenchanko
931 Uakaniko'o Street
Wahiawa, Hawai'i 96786

Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Mr. Clifford S. Jamile
Manager and Chief Engineer

Contact
Mr. Scott Muraoka
527-5221 Fax 527-5703

Wahiawa - Whitmore Village 16-inch Water Main Interconnection

Dear Sir,

I am responding to your development summary on behalf of the Friends of Kukaniloko, researchers for the HawaiianCivic Club of Wahiawa.

We would request that all work be done within the City owned easements that are described in alternatives #1 and #2.

This request reflects the cultural significance of the lands of the Lo-ali'i, Lihue Wahiawa and Halemano, a conservative land mass estimate of 36,000 acres in Central O'ahu. Traditional boundary markers, ka'anani'au, demarcate the lands of the Lo-ali'i upon which the long houses, kulanakauhale, were situated for domicile and the education of the first born of the ali'i and maka'ainana. Pu'uhonua Kukaniloko, waikau Ho'olonopahu, kua pu'u Kukaniloko, kanaku, kusikua, kaniula, halemano, paupahi, halawa, o'ahunui, mannauna, kulihemo, kanewai, halahape, kahikea, paka, halemano, malamanui, kalena are important to the history of who we are as a people of Hawai'i.

We request, with greatest concern, that the land not be dug into for the purpose of this project, as expressed in the proposed action and alternative #3.

One-hundred years of misrepresentation and misinterpretation leaves us with the spiritual aspect, mana, left on the land by our ancestors.

We appreciate this opportunity to comment on this summary and invite you to our September 12th Civic Club meeting to present your proposal of this project.

Eo Hawai'i

Thomas J. Lenchanko TL 9/4/01

The Friends of Kukaniloko
621-5184 - Home 696-7780 - Work 696-9926 - Fax

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

January 31, 2002

Mr. Thomas Lenchanko
Friends of Kukaniloko
931 Uakanikoʻo Street
Wahiawa, Hawaii 96786

Dear Mr. Lenchanko:

Subject: Draft Environmental Assessment for the Board of Water Supply's Proposed Wahiawa - Whitmore Village 16-Inch Water Main Interconnection, Wahiawa, Oahu, Hawaii, TMK: 7-1-2-4 & 18; 7-1-3; 7-1-4; and 7-1-10

This is in regards to your letter on behalf of the Friends of Kukaniloko regarding the Draft Environmental Assessment (EA) for the proposed project.

We apologize for the delay and have the following response to your request that all work be done within the City-owned easements due to your concerns of the historical importance and cultural significance of Lo-aliʻi, Lihue Wahiawa, and Helemano land areas in the project vicinity:

1. An indication that traditional Hawaiian practices and beliefs occur or have occurred in an area is evidence of archaeological, historical, and botanical resources. The following paragraphs outline information gathered through fieldwork and assessments:

   a. Archaeological Assessment

   Cultural Surveys Hawaii, Inc., performed an archaeological assessment on the proposed waterline route. The report, dated May 2000, provided a documentary of development in the Wahiawa area. In traditional Hawaiian times, Wahiawa was thought to have a sacred birthing site. Through the early 1800's, Wahiawa served as the primary location for the Hawaiian chiefs to harvest sandalwood and export these trees to the Orient. With the overthrow of the Hawaiian monarchy and the increase in agricultural interests, Wahiawa developed into homestead and agricultural lands including the area along the proposed waterline route as shown in the enclosed map. The areas on the northeast end of the proposed waterline route were transformed into pineapple fields. During this period, the Kaukonahua Stream was also altered to meet the needs of Waialua Sugar Company. Thus, the Wahiawa Dam and Reservoir were built along the Kaukonahua Stream to provide irrigation. The Wahiawa Dam and Reservoir still exist today for flood control and storm water storage.

In addition to this documentary of Wahiawa, Cultural Surveys Hawaii, Inc., performed a field survey of the proposed waterline route. No surface archaeological sites were observed on any portion of the proposed water main alignment. Both ends of the proposed alignment will be constructed within asphalt-paved roads through residential areas. The gulch that slopes down to the reservoir is steep and has been heavily impacted by human intrusion, as evidenced by the presence of modern litter. There is no evidence of traditional Hawaiian activity observed on the grassy bank of the reservoir. It is likely that the rising waters of the reservoir would have destroyed traditional taro loʻi terracing or features associated with the former free-flowing stream.

Paul H. Rosendahl, Inc., conducted a previous archaeological investigation in the area in 1992. No archaeological sites or subsurface deposits were uncovered during this survey in the general vicinity of the proposed water line route or along the reservoir banks. This study did note the large amount of human disturbance evidenced by litter and former campsites on the riverbanks.

b. Botanical Resources Assessment

A botanical resources assessment was conducted by Char & Associates in May 2000. The field survey performed along the proposed water line route did not provide evidence of any endangered or threatened species or species of concern. The assessment stated, "All of the plants can be found in similar environmental habitats throughout the Hawaiian Islands." In addition, the assessment concluded that the proposed water line work would not produce a significant negative impact on the botanical resources or affect any wetlands.

c. State Historic Preservation Division

The State Historic Preservation Division has also reviewed the Draft Environmental Assessment for the proposed water line alignment and responded in the enclosed letter dated September 17, 2001. Based upon their review of historic reports, maps, aerial photographs, and Cultural Surveys Hawaii, Inc.'s archaeological assessment, there are no known historic sites along the proposed water line route. In addition, the project is believed to have "no effect" on historic sites.

d. Cultural Impact Summary

Although historical documentation has indicated the significance of Lo-aliʻi, Lihue Wahiawa and Helemano in traditional times for the Native Hawaiians, agricultural activity during the early twentieth century would have impacted the land including all portions of the proposed waterline. These assessments have determined that the proposed project will not have a significant effect on any archaeological, historical, and botanical resources. Further, the pipeline will not diminish or otherwise impact stream flow or aquatic resources. Thus, the proposed project is not anticipated to significantly affect cultural resources and traditional gathering practices of the Native Hawaiians and the people of Hawaii.

2. We note your request that all work be done within existing easements described in Alternatives 1 and 2. The following is a brief summary of the three alternatives as well as the preferred alignment that were evaluated:

Tie Preferred Alignment vs. The Alternative Alignments

The preferred route is approximately 3,200 linear feet (l.f.) and traverses within the existing right-of-ways of Kellog Street, Kaala Avenue, and Clark Street in Wahiawa; and Uwalu Circle, Circle Makai Street, Nani Ihi Avenue and Whitmore Avenue in Whitmore Village. The preferred alignment extends approximately 1,400 l.f. beyond the existing right of ways and crosses Wahiawa Reservoir along the North Fork of Kaukonahua Stream between Clark Street in Wahiawa and Uwalu Circle in Whitmore Village. This alternative was chosen over the other alternatives based on the following:

- Alternative 1: Along California Avenue, Mango Street, Kilani Avenue, Kamehameha Highway and Whitmore Village.

  Disadvantages:

- This is the longest alignment of approximately 12,300 l.f. with an estimated construction time of 23-29 months.
- Requires a Conservation District Use Permit.
- The main would cross the Wahiawa Reservoir by either hanging on Karston Thot Bridge or from a separate supporting structure next to it. (Note: Karston Thot Bridge is eligible for both National and Hawaii Register of Historic Places.)

- Alternative 2: Along Kilani Avenue, Kamehameha Highway, and Whitmore Avenue.

  Disadvantages:

- The length of alignment is approximately 11,600 l.f. with an estimated construction time of 21 to 27 months.
- Requires a Conservation District Use Permit.
- Kilani Avenue is crowded with existing utilities. If the main should break, it may affect the other adjacent utilities.

- Alternative 3: Runs parallel to existing main along Kellog Street from the Kaala Avenue intersection, crossing the gulch and reservoir and connecting to existing Wahiawa-Whitmore Village water main.

  Disadvantages:

- The length of alignment is approximately 1,800 l.f. longer than the preferred alignment.
- Approximately 100,000 sq. ft. of additional easement area would need to be acquired.
- If the water mains are too close, they may be susceptible to damage should the other main break.

Alignment Summary

Alternatives 1 and 2 are approximately 4 times the length of the preferred alignment incurring as much as $4,000,000 in additional construction costs.

Alternative 3 is approximately 1,800 l.f. longer than the preferred alignment and would require the existing easement to be widened by 20 feet adding approximately $800,000 in additional construction costs. The preferred alignment is more feasible and will not significantly impact cultural and archaeological resources. Therefore, we maintain our preferred alignment alternative to provide reliable water service and fire protection to Whitmore Village at reasonable costs.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

CLIFFORD S. JAMES
Manager and Chief Engineer

Enclosures

cc: Genevieve Salmonson - Office of Environmental Quality Control
Kay Muranaka, Engineering Concepts, Inc.

APPENDIX C

BOTANICAL RESOURCES ASSESSMENT
by Char & Associates

BOTANICAL RESOURCES ASSESSMENT
BWS WAHIAWA-WHITMORE VILLAGE INTERCONNECTION
WAHIAWA, O'AHU

by

Winona P. Char
CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i

Prepared for: ENGINEERING CONCEPTS, INC.

June 2000

BOTANICAL RESOURCES ASSESSMENT
BWS WAHIAWA-WHITMORE VILLAGE INTERCONNECTION
WAHIAWA, O'AHU

INTRODUCTION

The proposed Board of Water Supply (BWS) 16-inch water line will connect the Wahiawa and Whitmore Village water systems, from the end of Clark Street in Wahiawa to Uwalu Cirle in Whitmore Village. The water line will be located on the steep slopes and across the North Fork of Kaukonahua Stream.

Field studies to assess the botanical resources found along the alignment of the proposed water line were conducted on 15 May 2000 by a team of two botanists. The primary objectives of the survey were to:

1) provide a general description of the vegetation along the new water line;
2) search for threatened and endangered species as well as species of concern; and
3) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. A topographic map (scale 1" = 60') with the alignment identified was examined to determine terrain characteristics, access, boundaries, and reference points. The alignment was flagged and

staked by the survey engineers prior to our field studies.

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, topography, disturbances, exposure, drainage, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium, and for comparison with the recent taxonomic literature.

The names of the flowering plants used in the report follow Wagner et al. (1990). The few recent name changes are those recorded in the Hawaii Biological Survey series (Evenhuis and Miller, eds. 1995-1998; Evenhuis and Eldredge, eds. 1999). The fern names are in accordance with Lamoureux (1988).

DESCRIPTION OF THE VEGETATION

From the north end of Clark Street, on the Wahiawa side, the proposed water line follows along an overgrown dirt road. A series of abandoned chicken coops line the road along with plantings of banana (Musa X paradisiaca), Heliconia spp., and ti (Cordyline fruticosa). A few large, old common mango trees (Mangifera indica) are also found in this area. On the slopes along the alignment, the vegetation consists of mixed introduced forest. Large blocks of Eucalyptus spp., 30 to 50 feet tall, are abundant. Other trees found here include Java plum (Syzygium cumini), rose apple (Syzygium jambos), African tulip (Spathodea campanulata), guarumo (Cecropia obtusifolia), and silk oak (Grevillea robusta). Understory vegetation consists of scattered shrubs of strawberry guava (Psidium cattleianum) and saplings of some of the trees mentioned above.

Ground cover is sparse where the tree canopy cover is dense and the ground heavily shaded; leaf litter and bare soil are the

common feature. A few scattered patches of more shade-tolerant species occur in areas where the tree cover is more open. Plants found here include basketgrass (Oplismenus hirtellus), Dicliptera chinensis, blechnum fern (Blechnum occidentale), white shrimp plant (Justicia betonica), and wood-fern (Christella parasitica).

The alignment then crosses onto an open, grassy area with scattered shrubs and trees. Hilo grass (Paspalum conjugatum) with scattered clumps of Guinea grass (Panicum maximum) make up 50 to 60% of the cover. Fiddlewood shrubs (Citharexylum caudatum), 10 to 15 ft. tall, are common. Other woody components found here include Christmas berry (Schinus terebinthifolius), guava (Psidium guajava), sourbush (Pluchea carolinensis), African tulip, Chinese banyan (Ficus microcarpa), Java plum, and albizia (Falcataria moluccana). Along the stream, the shrub-covered banks drop off sharply into the water.

On the Whitmore Village side of the stream, the banks are again steep. On the slopes above the stream, the proposed water line alignment crosses open, grassy areas interspersed with patches of mixed scrub forest, 6 to 40 feet tall. The open, grassy areas support dense mats of molasses grass (Melinus minutiflora), and clumps of broomsedge grass (Andropogon virginicus), ricegrass (Paspalum scrobiculatum), and manienie 'ula or golden beardgrass (Chrysopogon aciculatus). In places, hairy swordfern (Nephrolepis multiflora) and kilau fern (Pteridium aquilinum var. decompositum) are locally abundant. Other plants found here include lantana (Lantana camara), 'ulei (Osteomeles anthyllidifolia), uluhe fern (Dicranopteris linearis), 'uhaloa (Waltheria indica), and pualele (Emilia fosbergii). Common components of the mixed scrub forest are Christmas berry, strawberry guava, guava, silk oak, Java plum, ironwood (Casuarina sp.), albizia, and Formosan koa (Acacia confusa). Areas with exposed, red soil are occasional.

Near Uwalu Circle, the alignment crosses an existing community garden. Plantings here include banana, ti, tapioca or cassava (Manihot esculenta), pumpkin (Cucurbita pepo), papaya (Carica papaya), eggplant (Solanum melongena), radish (Raphanus sativus), etc. A few citrus (Citrus sp.) and mango trees are also found here.

DISCUSSION AND RECOMMENDATIONS

The vegetation along the proposed Wahiawa-Whitmore Village water line alignment is dominated by introduced plants such as Java plum, eucalyptus, strawberry guava, guava, Hilo grass, molasses grass, etc. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's discovery of the islands in 1778. A few native species are found along the alignment. One species, the kilau fern (Pteridium aquilinum var. decompositum), is endemic, that is, it is native only to the Hawaiian Islands. The other five species are all indigenous, that is, they are native to the Hawaiian Islands and elsewhere. These are the 'ulei (Osteomeles anthyllidifolia), 'uhaloa (Waltheria indica), ricegrass (Paspalum scrobiculatum), manienie 'ula or golden crownbeard (Chrysopogon aciculatus), and uluhe fern (Dicranopteris linearis).

None of the plants found during the survey is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999). All of the plants can be found in similar environmental habitats throughout the Hawaiian Islands. The proposed alignment does not cross any wetland areas. The steep banks of the stream drop off sharply into deep waters along the alignment.

The proposed water line is not expected to have a significant negative impact on the botanical resources or affect any wetlands. However, soil erosion and discharge of sediments into the stream is of concern given the steep topography. It is recommended that areas cleared of vegetation be revegetated as soon as possible to prevent soil loss. Hilo grass can be used for the slopes on the Wahiawa side and manienie 'ula or golden beardgrass can be planted on the slopes of the Whitmore Village side. The steeper, more eroded slopes on the Whitmore Village side may also require placement of erosion matting.

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APPENDIX D

AQUATIC RESOURCES SURVEY
by AECOS, Inc.

Aquatic resources survey for the BWS Wahiawa-Whitmore water line environmental assessment

AECOS, Inc., 970 N. Kalaheo Ave., Suite C311
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Aquatic resources survey for the BWS Wahiawa-Whitmore water line environmental assessment[1]

July 27, 2000 *AECOS* No. 946

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Introduction

The Wahiawa-Whitmore Board of Water Supply (BWS) interconnecting water line involves constructing a buried 16-inch water line between Whitmore Avenue in Whitmore Village and the intersection of Kaala Avenue and Kellog Street in Wahiawa. Separating these two points is the moderately steep-sided gorge of the North Fork of Kaukonahua Stream. At this point in the gorge, Kaukonahua Stream is actually submerged by a dam, and the water backed up behind the dam is known as Wahiawa Reservoir or Lake Wilson. The BWS water line, consisting of ductile iron pipe with ball joints, will be laid uncovered on the bottom of the reservoir. Beyond the submerged portion, the line will consist of standard ductile iron installed below grade (Engineering Concepts, 2000).

Methods

A field reconnaissance survey was undertaken on July 3, 2000. Only the north shore of the reservoir for a distance of approximately 150 m, (500 ft) encompassing the project site as shown in Figure 1 was surveyed. Visual observations could be made across the reservoir, a distance of only some 30+ m, but an extensive mat of California grass (*Brachiaria mutica*) limited actual sampling along the shore. Because of deep and turbid water, observations of biota in the reservoir at this location were extremely limited. Consequently, our report is based upon both this field visit and knowledge from various sources about Wahiawa Reservoir. Primary

[1] Report prepared for Engineering Concepts, Inc. for an environmental assessment entitled: "Wahiawa-Whitmore Village 16-inch water main interconnection.." This report will become public record.

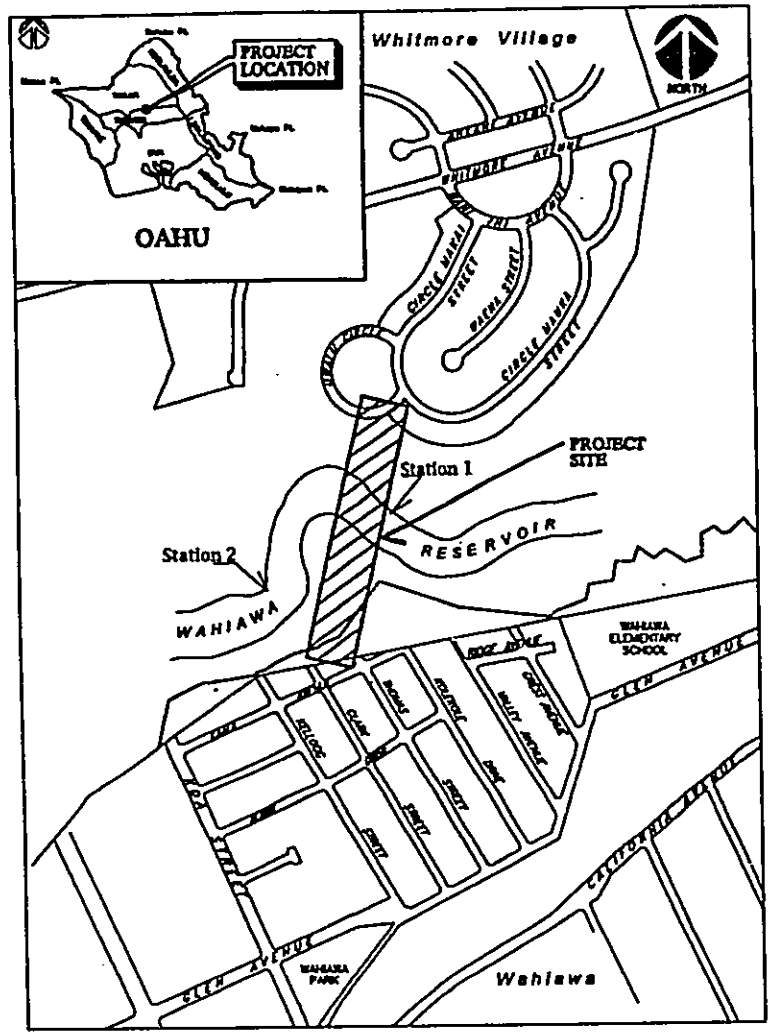

Figure 1. Map showing location of project between Wahiawa (bottom) and Whitmore Village (top)

sources of information are a draft EA prepared for the Wahiawa Wastewater Treatment Plant Modifications (Calvin Kim and Gerald Park Urban Planner, 1998) and various documents prepared by State of Hawaii, Dept. Land and Natural Resources, Aquatic Resources Division (e.g., Devick, 1981, 1988, 1989).

Water quality measurements were made in two locations (Figure 1) primarily for the purpose of comparing water quality at the time of the field reconnaissance with the fairly extensive body of information which exists for Wahiawa Reservoir water quality. At Station 1, water was collected from among grass plants at the shore. At Station 2, collection of a sample (and placement of *in situ* probes) required walking out across the floating grass mat some 4-5 m (12-15 ft) to the edge of the open water. Methods of water quality analyses are given in Table 1. All collected samples (assigned Log No. 13184) were returned to *AECOS* laboratory soon after collection and, for some parameters, analyzed immediately or preserved by freezing.

Table 1. Analytical methods and instruments used for the July 3, 2000 sampling in Wahiawa Reservoir, north branch below Whitmore Village.

Analyses List	Method	Reference	Instrument
Ammonia	alkaline phenol	Koroleff in Grassboff et al. (1986)	Technicon AutoAnalyzer II
Conductivity	Method 2510B (EPA 120.1)	Standard Methods 18th Edition (1992)	Hydach pH/conductivity meter
Dissolved Oxygen	EPA 360.1	EPA (1979)	YSI Model 57 DO meter
Nitrate + Nitrite	EPA 353.2	EPA (1993)	Technicon AutoAnalyzer II
pH	EPA 150.1	EPA (1979)	Orion SA 250 pH meter / Ross combination electrode
Temperature	thermister calibrated to NBS cert. Thermometer (EPA 170.1)	EPA (1979)	YSI Model 57 DO meter
Total Nitrogen	persulfate digestion /EPA 353.2	D'Elia et al. (1977) / EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	persulfate digestion /EPA 365.1	Koroleff in Grasshoff et al. (1986) / EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids (TSS)	Method 2540D (EPA 160.2)	Standard Methods 18th Edition (1992); EPA (1979)	Mettler H31 balance
Turbidity	Method 2130B (EPA 180.1)	Standard Methods 18th Edition (1992); EPA (1993)	Hach 2100P Turbidimeter

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Environment Description

Wahiawa Reservoir, locally known as Lake Wilson, is comprised of a pair of narrow gulches drowned by the 1906 construction of a dam below the confluence of the North and South Forks of Kaukonahua Stream (State Code No. 3-6-06.02) on the central plateau of O'ahu. The reservoir was built by the predecessors of the Waialua Sugar Company for the primary purpose of irrigating sugar cane fields lying to the north. The town of Wahiawa lies on the higher ground (an interfluve) between the two forks of the stream. Overflow from the dam enters Kaukonahua Stream which flows northward, joining Poamoho Stream to form Ki'iki'i Stream, the latter entering the ocean at Kaiaka Bay on the north shore of O'ahu (*AECOS*, 1998).

The reservoir has a maximum capacity of about 2.5 billion gallons (Lum and Young, 1976) at a dam spillway elevation of 257 m (842 ft) above mean sea level (MSL) (Moore et al., 1981). A rubber dam was installed over the spillway in the 1970s to increase the impoundment's capacity to about 3 billion gallons (Lum and Young, 1976). However, this device has fallen into disrepair and the reservoir capacity is once again at approximately 2.5 billion gallons (Loke, 1996).

Since 1928, the Wahiawa Waste Water Treatment Plant (WWTP) has discharged treated effluent into the south branch of the reservoir. Sometime later, both *Schofield Barracks WWTP and Whitmore Village WWTP used the reservoir for* disposal. The Whitmore Village WWTP discharge pipe is located in the present project area. However, discharge from this plant was discontinued in 1994. The domestic wastewater from Whitmore Village and a nearby Navy communications facility (NCTAMS) is now treated at the Wahiawa WWTP (Calvin Kim & Assoc. and Gerald Park, 1998).

A considerable body of data has been collected for Wahiawa Reservoir over the past twenty-five years in an effort to characterize cause and effect relationships for water quality in this impoundment. Included have been studies dealing with the effects of sewage disposal (Wahiawa WWTP discharge into the south arm) on water quality, eutrophication potential of the sediments, fish toxicity, algal growth potential, and changes in sport fishery conditions arising from both water quality and the numerous introductions of exotic fishes to the reservoir (*AECOS*, 19998).

The project location is approximately 2.7 km (1.7 mi) upstream of the dam and some 1.5 km (0.9 mi) downstream from where the North Fork of Kaukonahua Stream enters Wahiawa Reservoir. Water depth here is obviously dependent upon reservoir water level, but is approximately 6 m (18-19 ft) in the middle of the channel. The project site is located on a broad curve of the gorge (Figure 1) and, as a consequence, the gorge margin and stream bank are much steeper on the outside, eroding face (north or right bank) than on the inside face (south or left bank) of the

bend. The width of the reservoir here is around 36 to 46 m (120 to 150 ft), but California grass extends as a floating mat out from the real shoreline, generally obscuring it. The width appears closer to 25 m (Figure 2).

Figure 2. Photograph from the right bank of Wahiawa Reservoir close to the point where the BWS water line would cross. This is WQ Station 1.

Water Quality

Fish kills starting in the 1960's signaled that pollution, or more specifically, eutrophication, was affecting the waters of the reservoir. Eutrophication is a common process in lakes and impoundments such as Wahiawa Reservoir as they age. Nutrients (specifically organic matter, nitrogen and phosphorus) accumulate in these standing bodies of water. In the presence of warm temperatures and sufficient sunlight, inorganic nutrients are taken up by algae or other plants to produce large standing crops of phytoplankton (algae suspended in the water) and attached or floating algae and vascular plants. Eutrophic bodies of water will be characterized by green, turbid water, high daytime dissolved oxygen (DO) levels, and high nutrient (total N and total P) content. Problems arise at night, when the large mass of plant matter stops producing oxygen and respiration of aquatic

plants and animals pulls the DO down. Extremes of low nighttime DO can produce massive fish kills. The water quality situation in a reservoir like Wahiawa is further complicated by stratification of water masses that can occur where temperature differences develop with depth (see RMTC, 1996; *AECOS*, 1998).

The results of the two surface water quality samples obtained on July 3 are presented in Table 2. Because both samples represent reservoir surface water that is moving slowly and probably well mixed horizontally within the sampling area, differences between the two stations sampled would not be expected to be great. In fact, the water quality at the two points is generally quite close for most of the parameters measured. The pH is within normal range, perhaps slightly elevated by photosynthesizing algae. The dissolved oxygen (DO) values are high, and indicate saturation, probably also consequence of midday photosynthesis of water column algae. Turbidity was moderately high, and although chlorophyll was not measured, it is likely that much of the turbidity would be attributable to phytoplankton in the water column. Conductivities were generally low.

Table 2. Surface water quality characteristics of the north branch of Wahiawa Reservoir below Whitmore Village on July 3, 2000.

	Time	Temp. (°C)	pH	DO (mg/l)	DO Sat. (%)	Cond. (µmhos)	Turbidity (ntu)
07-03-00							
Sta. 1	1135	27.2	7.45	8.1	102	78.6	14.2
Sta. 2	1225	27.2	7.55	7.9	99	78.2	11.7

	TSS (mg/l)	Ammonia (µg N/l)	Nitrate + nitrite (µg N/l)	Total N (µg N/l)	Total P (µg P/l)
07-03-00					
Sta. 1 1135	11.1	31	1	560	37
Sta. 2 1225	12.8	10	< 1	466	28

Typical total N values for the north fork in recent years have been at least as high as those recorded on July 3. *AECOS* (RMTC, 1996) monitoring this area between 1995-96 measured a mean value of 740 µg N/l for surface waters of the north fork (summarized in *AECOS*, 1998). Nitrate plus nitrate values were very low (undetectable in one sample) in our July 3 results. Ammonia, on the other hand, was fairly high. Again, *AECOS* (RMTC, 1996) monitoring ammonia in 1995-96 measured a surface water mean of 20 µg ammonia-N/l, essentially the same as the

average of our two samples. Like total N, total P levels were in line with measurements made in 1995-96 that produced a mean of 30 µg P/l (RMTC, 1996).

Although the two samples reported here represent only a small part of the reservoir and conditions during a single point in time, the results are very consistent with the known water quality of Wahiawa Reservoir based, in some cases, on long term monitoring efforts.

Biological Resources

The banks and riparian zone in the project area are mostly dominated by California grass. In places, however, the bank descends so steeply into the water that plants cannot get established on the eroding soil face. In some places Christmasberry (*Schinus terebinthifolius*), strawberry guava (*Psidium cattleianum*), silk oak (*Grevillia robusta*), banyan (*Ficus microcarpa*), and fiddlewood (*Citharexylum caudatum*) occur close to the reservoir. Higher up the slopes, octopus tree (*Schefflera actinophylla*), ironwood (*Casuarina equisetifolia*), guarumo (*Cecropia obtusifolia*), albizia (*Paraserianthes falcataria*), Java plum (*Syzygium cumini*), and gum (*Eucalyptus* sp.) form a mixed forest which varies from very closed to very open canopy from place to place. Several swales are located on the north margin of the gulch in the project area. Typical understory species here include hilo holly (*Ardisia crenata*), hairsfoot fern (*Phlebodium aureum*), white shrimp plant (*Justicia betonica*), Coster's curse (*Clidemia hirta*), juvenile satin leaf (*Chrysophyllum oliviforme*), and Guinea grass (*Panicum maximum*). Open areas are mostly dominated by broomsedge (*Andropogon virginicus*) or molasses grass (*Melinis minutiflora*), with vervain (*Stachytarpheta urticifolia*) and other ruderal species in disturbed sites. Native 'ulei (*Osteomeles anthyllidifolia*) occurs on exposed ridges well up the slope from the water and outside of the project area indicated in Figure 1.

The only aquatic organisms observed during the field visit were the non-native damselfly, *Ischnura posita*, and a small pond snail (specimen lost). Net sweeps were made in the submerged grasses in a search for small fishes or invertebrates, but these efforts yielded only the one small specimen.

The Department of Land and Natural Resources (DLNR) began stocking Wahiawa Reservoir with sport fish in the 1950s. This imposed a third use on the impoundment, in addition to irrigation and waste disposal. A portion of Wahiawa Reservoir is designated the Wahiawa Public Fishing Area and comprises approximately 120 ha (300 ac) of fishable water. Access is generally via Wahiawa State Freshwater Park along the South Fork of the reservoir (State DLNR, 1990), although fishing from shore is possible in many areas. The first species to be stocked was the Mossambique tilapia (*Oreochromis mossambica*). Many additional

species of imported fishes have since been added, resulting in establishment of sport fisheries for tucanare, largemouth and smallmouth bass, bluegill, channel catfish, oscar, pongee, puntat, tilapia, and carp. In the 1970's it was estimated that the reservoir supported 400 tons of fish of which at least 300 tons were tilapia (Schmitt, 1973, citing W. Devick, Division of Fish and Game, pers. comm.). Table 3 lists fishes established in the reservoir from data acquired in the 1980's.

Table 3. List of fish species established in Wahiawa Reservoir as of 1988 (from *AECOS*, 1998, after Devick, 1988).

Scientific Name	Common name	Abundance	Year and type of introduction
Tilapia mossambica	Tilapia	Extremely abundant	1952 - deliberate
Dorosoma petenense	Threadfin shad	Extremely abundant	1959 - deliberate
Tilapia melanotheron	Tilapia	Very abundant	1978 - accidental
Pterygoplichthys multiradiatus	Armored catfish	Very abundant	1986 - accidental
Chichla ocellaris	Tucunare	Abundant	1964 - deliberate
Micropterus salmoides	Largemouth bass	Abundant	1908 - deliberate
Ophicephalus striatus	Pongee snakehead	Abundant	1904 (est.) - deliberate
Xenentodon cancila	Stickfish	Abundant	1988 - accidental
Ictalurus punctatus	Channel catfish	Abundant	1959 - deliberate
Gambusia affinis	Mosquito fish	Abundant	1905 - deliberate
Tilapia macrochir	Tilapia	Common	1957 - deliberate
Micropterus dolomieu	Smallmouth bass	Common	1958 - deliberate
Clarias fuscus	Puntat chinese catfish	Common	1904 (est.) - deliberate
Cyprinus carpio	Koi carp	Common	1904 (est.) - deliberate
Lepomis macrochirus	Bluegill	Common	1946 - deliberate
Awaous stamineus	O'opu	Common	Native species
Carassius auratus	Goldfish	Unusual	1904 (est.) - accidental
Astronotus ocellatus	Oscar	Unusual	1958 - deliberate
Xiphophorus helleri	Swordtail	Unusual	1968 - accidental
Misgurnus anguillicaudatus	Dojo	Unusual	1904 (est.) - deliberate
Pterophyllum sp.	Angelfish	Rare	1982 - accidental
Colossoma macropomum	Pacu	Rare	1987 - accidental

In addition to the government stocking of various game fishes, numerous other species have become established in the reservoir through purposeful or accidental releases of aquarium species. The armored catfish, *Pterygoplichthys multiradiatus*, was first detected in Wahiawa Reservoir in 1986 and by 1988 had become one of the most abundant fishes in the reservoir (Devick, 1988). The stickfish, *Xenentodon cancila*, also demonstrated a very large increase in population numbers in the reservoir in 1988. This fish is described by Devick (1988) as an aggressive top-level predator that is a threat to game fish production. Most recently, another species of cichlid, *Hemichromis fasciatus* or jewel cichlid, was introduced to Wahiawa Reservoir. This species is similar to the stickfish in being an aggressive predator on other species, especially the juveniles of more desirable game fishes (Devick, pers. comm.).

It is fair to assume that all of these fish species will occur in the project area. We were somewhat surprised that smaller species, like the topminnows and juveniles of the larger species, were not at least evident in small numbers in the partially submerged vegetation along the banks. These smaller individuals have been observed to be abundant in shallows near the dam on other occasions. There also is to be expected various invertebrate species, such aquatic insects, snails, and small crustaceans. However, the water depth increases quickly off the north bank, making sampling for these species difficult because only limited parts of the near shore could be reached.

It is possible that the project area is sometimes utilized by aquatic birds, although none was seen during our field survey. Wahiawa Reservoir was not included in an inventory of State wetlands of importance to water birds (Shallenberger, 1977). It does not even appear to be mentioned in that report, which includes a section on wetlands of marginal value to waterbirds. Although conditions are not very good for feeding from the banks, the black-crowned night heron (*Nycticorax nycticorax hoactli*) is a wetland species commonly found around streams, ponds and lakes on O`ahu and might well be observed on occasion in this area.

Impacts of the Project on the Aquatic Environment

This project entails trenching on steep slopes of the gorge on both sides of the reservoir and laying, presumably without trenching, a sealed water pipe across the reservoir bottom. Trenching on the north slope will be difficult and result in the exposure of soil on steeply sloping ground. In this area, the potential for erosion during rains will be great until the open trench is covered and revegetated. On the south slope, the trench follows an existing track (unimproved road), a course that is far less steep. Further, unlike the north slope which descends steeply and directly into the water, the south slope is mostly separated from the reservoir by a low plateau, onto which runoff from the project would be directed.

The most obvious problem facing the aquatic ecosystem entails the potential for significant quantities of soil to be washed into the reservoir. The actual adverse impacts of this would be relatively minor. The reservoir represents a point in Kaukonahua Stream where accumulation of sediment is occurring as a result of the stream having been dammed nearly a century ago. Much of the sediment naturally carried by both forks of the stream upstream from the reservoir ends up in the reservoir. Some portion in suspension may be carried over the dam during freshets or floods, or is removed with irrigation withdrawals. But the majority contributes to the process of infilling that is the ultimate fate of the reservoir. Although it is recommended that the BWS project make all attempts to minimize soil losses during construction, the water quality and ecosystem implications of sediment

laden runoff from the project is minor in comparison with natural processes of erosion occurring in the area and contributing sediment to Wahiawa Reservoir during rain storms.

No aquatic species listed as endangered, threatened, proposed or as a candidate species by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973 as amended (ESA), or by the State of Hawai`i under it's endangered species program (State DLNR, 1996; CFR, 1999; Federal Register 1999) were detected during the course of this survey. The most likely "listed" species to occur in the aquatic portion of the project area is the black-crowned night heron. This species is listed as "indigenous" under State of Hawaii, Administrative Rules (State DLNR, 1996) and is thus protected from hunting, capture, or export (HAR §13-124-3(a)).

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APPENDIX E

ARCHAEOLOGICAL INVENTORY SURVEY
by Cultural Surveys Hawaii, Inc.

**ARCHAEOLOGICAL ASSESSMENT
OF A PROPOSED WATER LINE ROUTE
BETWEEN WHITMORE VILLAGE AND WAHIAWA,
IN THE *MAUKA* PORTION OF KAMANANUI *AHUPUA'A*,
WAHIAWA DISTRICT, ISLAND OF O'AHU
(TMK 7-1-02)**

by

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and
Rodney Chiogioji, B.A.

Prepared for

ENGINEERING CONCEPTS, INC.

Cultural Surveys Hawai'i
May 2000

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I. INTRODUCTION

A. Project Background

At the request of Engineering Concepts, Inc., Cultural Surveys Hawai'i has completed an archaeological assessment of the proposed route of a 16-inch water line which will connect the Wahiawa and Whitmore Village water systems (TMK 7-1-02)(Figures 1-4). The proposed water line would connect to an existing 12-inch main in Kellogg Street at the Kaala Avenue and Kellogg Street intersection. The water line would then travel southwest along Kaala Avenue toward the Kaala Avenue and Clark Street intersection where it would turn north to the north end of Clark. It would then travel down the south side of the Kaukonahua Stream-Wahiawa Reservoir gulch, cross the stream-reservoir, and travel upslope to Uwalu Circle in Whitmore Village. From Uwalu Circle the line continues to Circle Makai Street, turns north along Nani Ihi Avenue, and reaches Whitmore Avenue. The proposed line finally turns east on Whitmore Avenue where it connects to an existing 12-inch water line.

B. Scope of Work

1. Historical research to include study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property.

2. Field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. This assessment will identify any sensitive areas that may require further investigation or mitigation before the project proceeds.

3. Preparation of a report to include the results of the historical research and the fieldwork with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate. It will also provide mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration. If monitoring is recommended, specific procedures will be listed such as frequency, extent, coordination and reporting.

C. Methods

Field Inspection

The proposed Wahiawa to Whitmore Village water line route was inspected on May 7, 2000 to identify possible surface historic properties. The inspection was documented by field notes and photographs.

Historical Research

Background research included a review of archaeological studies in the library of the State Historic Preservation Division; document searches at the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, the libraries of the University of Hawai'i-Manoa, and the Archives of the Bishop Museum; and a study of maps at the Survey Office of the Department of Land and Natural Resources.

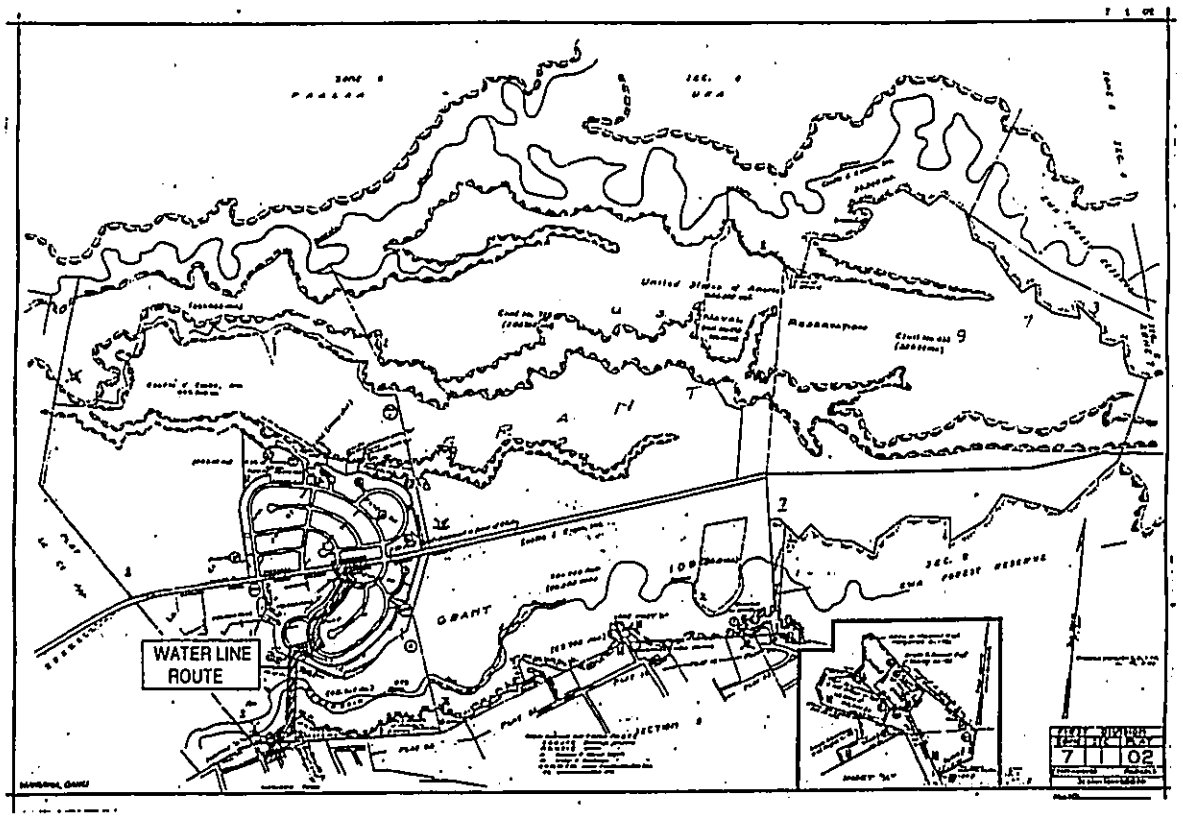

Figure 2 Tax map (TMK 7-1-02) showing proposed water line route (hatched)

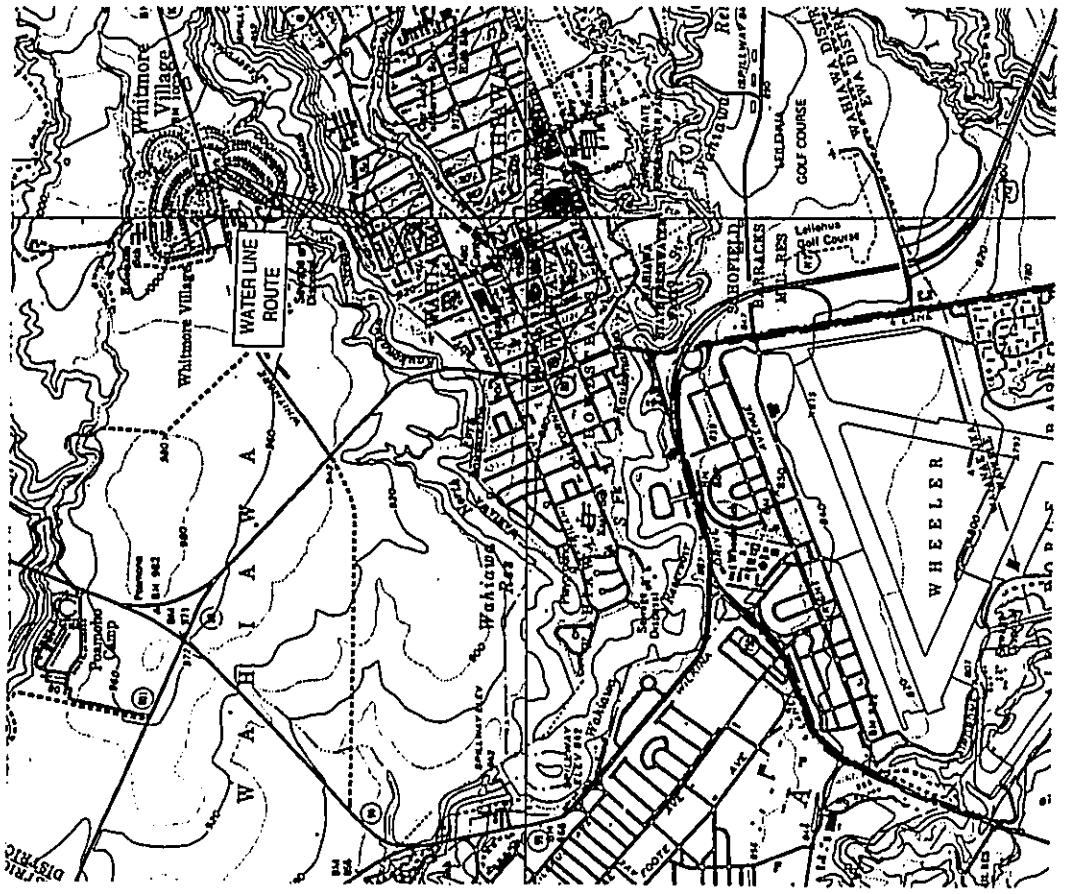

Figure 1 Portion of USGS 7.5 Minute Series Topographical Map, Schofield Barracks, Haleiwa, Hauula, and Waipahu quadrangles, showing proposed water line route (hatched)

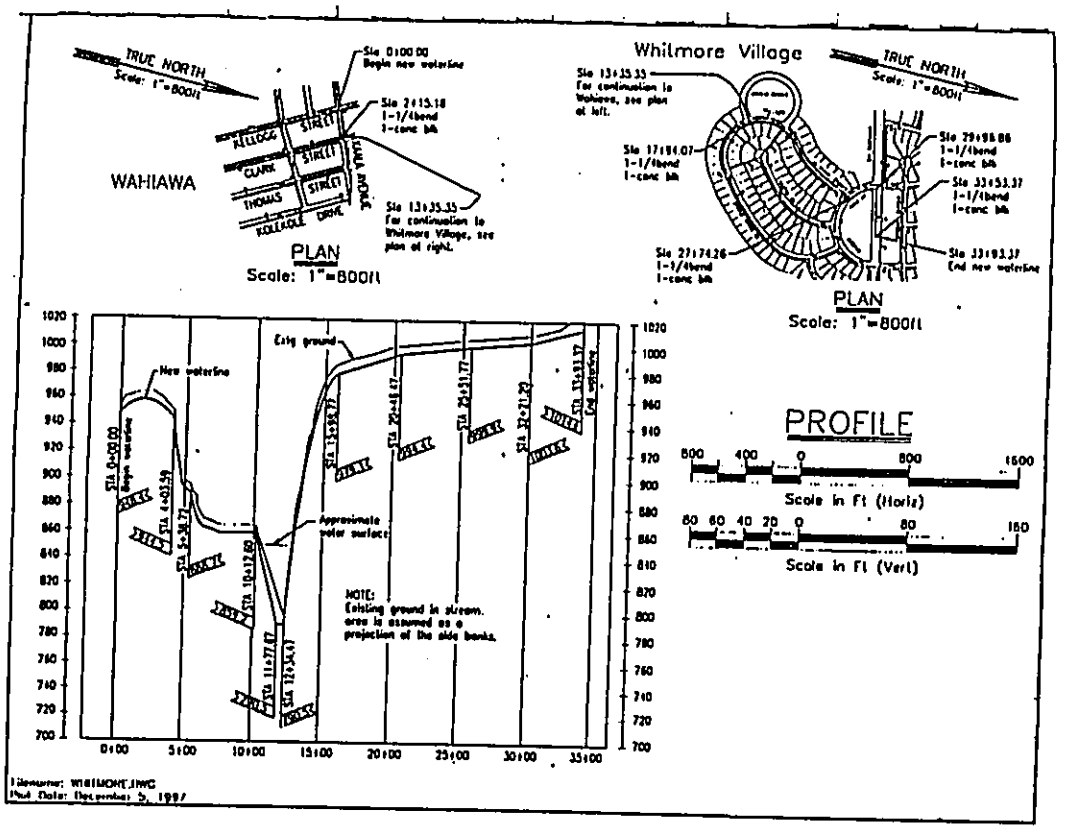

Figure 3 Plan and profile of proposed water line route (note steep slope into Wahiawa Reservoir- Kaunōkahua Stream gulch

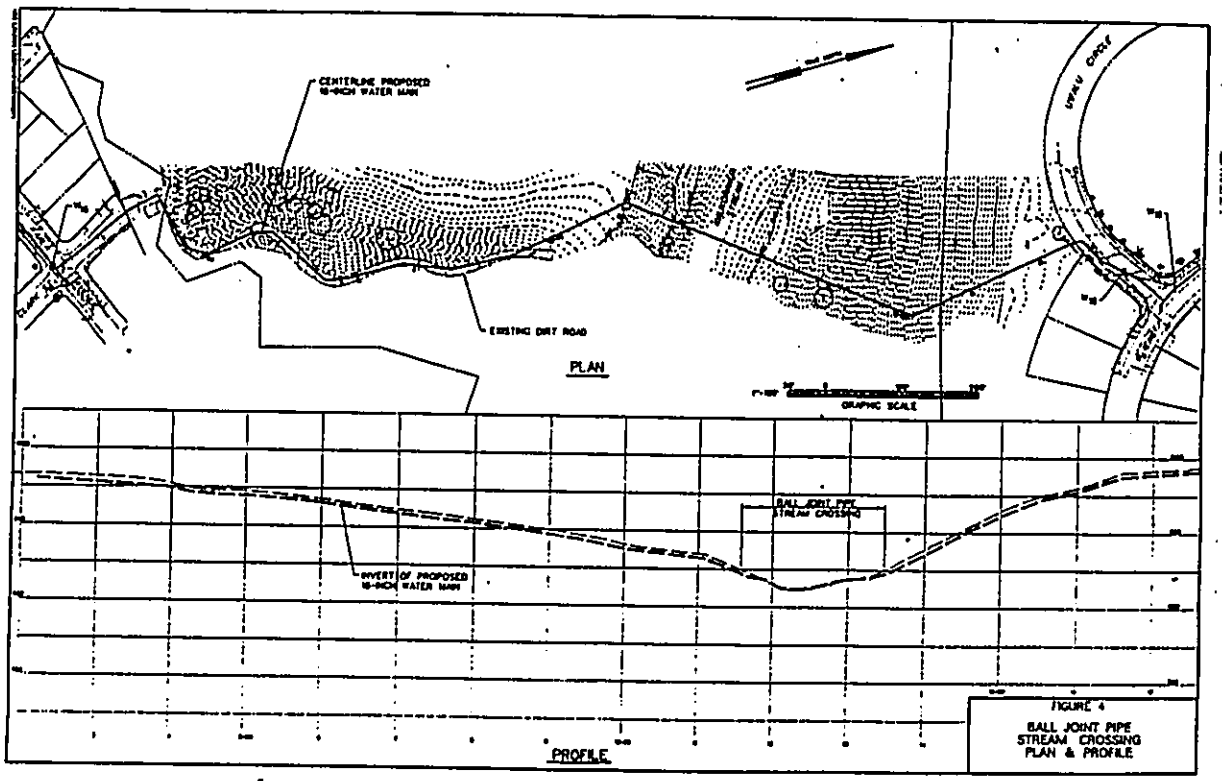

Figure 4 Plan and profile of Wahiawa Reservoir-Kaukonahau Stream portion of proposed water line route

II. NATURAL SETTING

The proposed Wahiawa-Whitmore Village water line route is located in the *mauka* reaches of Kamananui *ahupua`a*. Kamananui extends from the seashore between Kaika Bay and Mokulē`ia Beach, into the Schofield Plateau of central O`ahu, terminating at the *Ko`olau Range. It is bounded to the west by the ahupua`a of Mokulē`ia 1, to the north by* Pa`ala`a *ahupua`a*, and to the south by Wai`anae Uka lands. On the opposite side of the Ko`olau Range is Kahana *ahupua`a*.

The geology of the general area of the proposed water line route is marked prominently by the formation of the Schofield Plateau and its subsequent erosion. The Schofield Plateau is the result of the younger Ko`olau volcanic basalt overflowing and banking against the older Waianae volcanic basalt. The Ko`olau and Waianae series were unaffected by the later Honolulu Series which is the only other volcanic series to occur on the island (MacDonald and Abbot 1974:352-354).

Foote's General Soil Map of O`ahu Island shows two soil associations for the proposed water line route. The plateaus on the Whitmore Village and Wahiawa Town sides of the route are Leilehua silty clay which occurs in broad and narrow areas bordered by gulches:

> In a representative profile the surface layer is dark reddish-brown silty clay about 12 inches thick. It contains concentrations of heavy materials. The subsoil, about 36, inches thick, is dark reddish-brown and dusky-red silty clay and clay that has subangular blocky structure. The substratum is dark reddish-brown clay mixed with weathered gravel. The soil is extremely acid throughout the profile. (Foote et al. 1972: 81)

Soil on the gulch sides bordering the Wahiawa Reservoir-Kaukonahua Stream bed is Helemano silty clay which occurs on the sides of V-shaped gulches:

> In a representative profile the surface layer is dark reddish-brown silty clay about 10 inches thick. The subsoil is about 50 inches thick, is dark reddish-brown and dark-red silty clay that has subangular blocky structure. The substratum is soft, highly weathered basic igneous rock. The soil is neutral in the surface layer and neutral to slightly acid in the subsoil. (*Ibid* .: 40)

The Helemano-Wahiawa association is an oxisol which possesses "exceptional resistance to physical deterioration under intensive mechanized agriculture" and is one of the "most important agricultural soils of the State" (Armstrong 1973:41).

III. KAMANANUI *AHUPUA`A* AND WAHIAWA: CULTURAL AND HISTORIC BACKGROUND

The *mauka* portion of Kamananui *ahupua`a* — where the proposed water line route is located — enters the Wahiawa area. (Wahiawa is both a traditional place name and a *modern district designation.) This section presents a review of the available documentary* evidence for the general character of the Wahiawa area as it had evolved in the years before western contact in the later 18th century. The development of Wahiawa lands adjacent to and including the present study area during the 19th century and into the early 20th century was recorded in increasingly detailed documentation — including government records and maps. Finally, during subsequent decades of the 20th century, abundant documentation of Wahiawa allows a more precise focus on the proposed water line route itself.

A. Wahiawa in Pre-Contact O`ahu

According to E.S. Craighill Handy and Elizabeth Handy:

> Wahiawa was from very ancient times, identified with the ruling *ali`i* of Oahu. The name analyzed is *Wahi* (place), *a* (belonging to), *wa* (noise). Perhaps the name goes back to the time when Hi`iaka was in this general area and could see waves dashing against the coast afar off and hear the ocean's ceaseless roar... (Handy and Handy 1972: 465)

The Handys suggest that a "sizable population" filled the Wahiawa area in traditional Hawaiian times, based on the "various areas of *lo`i* northwest of the present town of Wahiawa..":

> There were extensive terraces that drew water from Wahiawa Stream, both above and below the present town. There were many small terrace areas along the sides of the valleys of all the streams of this general area. These streams tap the southwest slopes of the Ko`olau range where it begins to lose altitude but it still very wet in the hinterland. The peculiarity of this area, apart from distance from the sea, is that it is the only extensive level area on [O`ahu] that is quite high. (*Ibid.*)

The pioneering Hawaiian historian Samuel M. Kamakau identifies Wahiawa with a specific chiefly degree:

> The chiefs of Lihue, Wahiawa, and Halemano on Oahu were called *Lo* chiefs, *po`e Lo Ali`i* ["people from whom to obtain a chief"], because they preserved their chiefly kapus...They lived in the mountains (*i kuahiwi*); and if the kingdom was without a chief, there in the mountains could be found a high chief (*ali`i nui*) for the kingdom. Or if a chief was without a wife, there one could be found — one from chiefly ancestors. (Kamakau 1964: 5)

One of the *Lo* chiefs was Kukaniloko. Kukaniloko is also the name of "one of the two

famous places in the Hawaiian islands for the birth of children of tapu chiefs...Kukaniloko is said to have been established by Nanakaoko and his wife Kahihiokalani, whose son, Kapwa, heads the list of the important *alii* born here" (McAllister 1933: 134, 135). It is located approximately 200 meters west of the intersection of Kamehameha Highway and Whitmore Road. Associated with — and located near — Kukaniloko was Hoolonopahu *heiau* where "were kept the sacred drums of Opaku and Hawea which announced the birth of an alii" (*Ibid.*: 147). Sacred sites like Kukaniloko and Hoolonopahu suggest the significant place of the Wahiawa area in the Hawaiian consciousness during pre-contact times.

B. Early Contact to mid-19th Century

Wahiawa enters the historical record in the sandalwood trade of the early 1800s. The Hawaiian Islands began exporting sandalwood to the Orient shortly after 1800 and the commerce flourished until the supply dwindled in the mid-1830s. Trade in sandalwood was the strict monopoly of the *ali`i* beginning with Kamehameha. At the height of the sandalwood boom, Kamehameha was buying foreign ships, including six vessels between 1816 and 1818, to transport his own wood to the Orient (Kuykendall 1965:87). According to Samuel Kamakau, Wahiawa was a prime source for the valuable wood, though harvesting it was not easy:

> ...Ka-lani-moku and all the chiefs went to work cutting sandalwood at Wahiawa, Halemano, Pu`ukapu, Kanewai, and the two Ko`olaus. The largest trees were at Wahiawa, and it was hard work dragging them to the beach. (Kamakau 1992: 207)

By the time the trade collapsed in the 1830s, its effects on the Hawaiian population and landscape had been devastating:

> The chiefs, old and young, went into the mountains with their retainers, accompanied by the king and his officials, to take charge of the cutting, and some of the commoners cut while others carried the wood to the ships at the various landings; none was allowed to remain behind. Many of them suffered for food; because of the green herbs they were obliged to eat they were called "Excreters of green herbs" (*Hilalele*), and many died and were buried there. The land was denuded of sandalwood by this means. (Kamakau 1992: 252)

Toward the mid-19th century, the Organic Acts of 1845 and 1846 initiated the process of the *Mahele* - the division of Hawaiian lands - which introduced private property into Hawaiian society. In 1848 the crown, the Hawaiian government, and the *ali`i* (royalty) received their land titles. Kamananui *ahupua`a* was held by the government. Subsequently in the *Māhele*, Land Commission Awards (LCAs) were given to commoners and others who could prove residency on and use of the parcels they claimed. No LCAs were registered in Kamananui.

The lack of LCA claims in Kamananui may not indicate the absence of an indigenous Hawaiian population in the *mauka* portion of the *ahupua`a* (i.e., where it

enters the Wahiawa District) at mid-19th century. Discussing the growth of Hawaiian education during the reign of Kamehameha III — from 1824 to 1854 — Samuel Kamakau notes: "At Kahalepo`ai, Hauone, Kalakoa, Wahiawa, Halemano, and Kanewai there were larger villages with teachers and schoolhouses..." (Kamakau 1992: 424).

C. Latter 19th Century to Early 20th Century

What became of the "larger village" at Wahiawa during the second half of the 19th century is unrecorded. Further, there is no documentation of any continuing Hawaiian presence in the general area of the present proposed water line route in Kamananui *ahupua`a*. However, towards the end of the 1800s, following the overthrow of the Hawaiian monarchy, western military, entrepreneurial and agricultural interests would transform the Wahiawa landscape, including the present proposed water line route. A portion of a 1902 territorial survey map of O`ahu shows two of these changes in Wahiawa (Figure 5). Following the annexation of the Hawaiian Islands by the United States in 1898, a presidential order of July 20, 1899 set aside Waianae Uka lands as the military reservation indicated on the map. Ten years later, in 1909, these lands would become the site of Schofield Barracks, names after Lt. General John M. Schofield.

The 1902 map also shows "Homesteads" in Wahiawa between the north and south forks of Kaukonahua Stream. The Wahiawa terminus of the proposed water line route is located within these homestead lands. In 1897 Byron Clark, a Californian, arrived in the Hawaiian Islands and became the Hawaiian Republic's commissioner of agriculture. Wanting to remain in the islands, Clark searched out land to purchase:

> But to buy or lease suitable land from private individuals proved too expensive. Searching for alternatives, Clark went to the government land office. He learned there was one piece of land, indeed the only one on the island of Oahu, that might be available for settlement. The tract was called Wahiawa. It had previously been leased to Oahu businessman James Robinson for cattle grazing. By the time of Clark's inquiry, the area had been designated homestead land by the Land Act of 1895. To receive title, each settler must live on and cultivate a portion of the land for three years. (Nedbalek 1984: 18)

Clark organized a group of families, mainly from California, who would join him in settling the whole tract of thirteen hundred acres — which became known as the Wahiawa Colony Tract. Having formed an agricultural cooperative called the Hawaiian Fruit and Plant Company, the homesteaders began formalizing and refining the physical organization of their Wahiawa settlement:

> Initially each settler lived in a house on his five-acre parcel in the town site and farmed his other land in the surrounding area. It was soon discovered, however, that each settler preferred to reside on his own farmstead, holding his town lot in reserve. The homesteaders abandoned the village plan and agreed that one man, Thomas Holloway, would live on their 145-acre central lot site. On 27 August 1902 a trust deed, often referred to as the Holloway

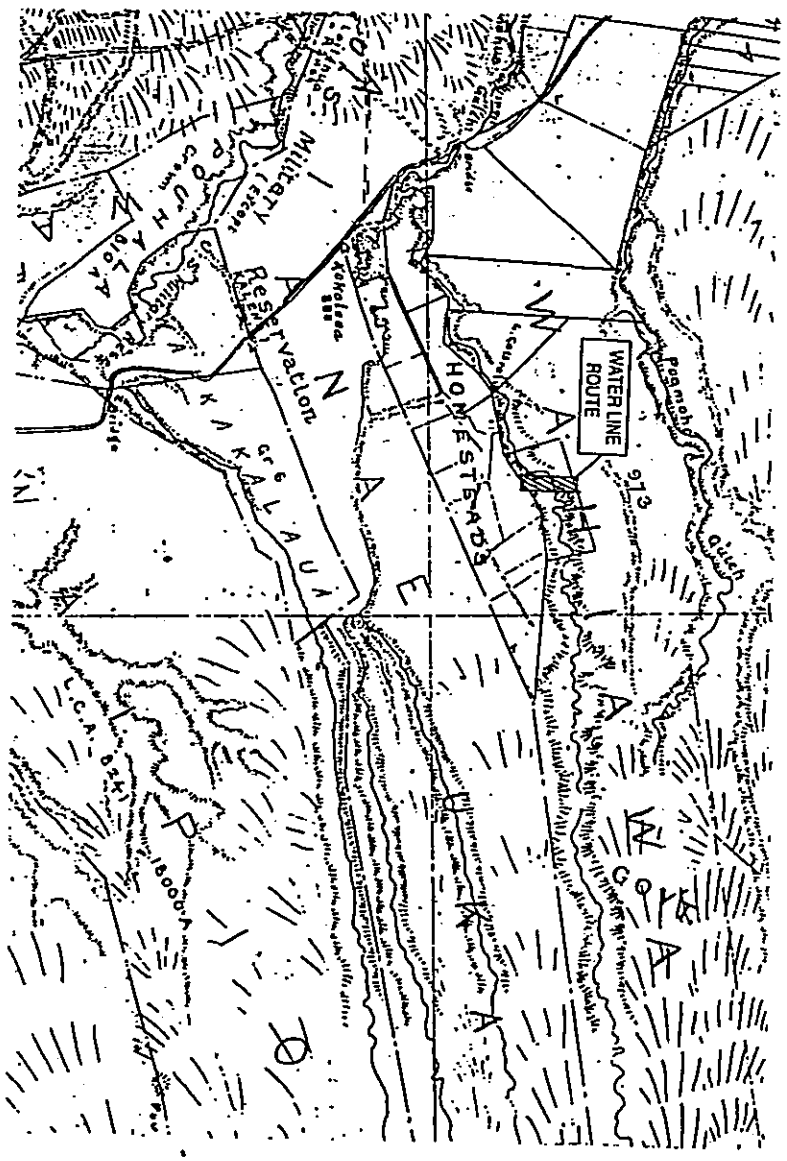

Figure 5 Portion of 1902 territorial survey map showing homesteads and U.S. military reservation in Wahiawa — with approximate location of proposed water line route indicated (hatched)

> Trust, formally set aside the central town lots for the use and benefit of the Wahiawa Settlement Association resident landowners. Within a few years most public facilities would be located there. (*Ibid.*: 20)

The layout of the homesteaders' settlement would develop, during subsequent decades of the 20th century, into Wahiawa Town. Some of the town's streets would be named for the early homesteaders — including Clark, Kellogg, Thomas, and Eames streets.

Another homesteader was James D. Dole, who moved to Wahiawa in 1900 to attempt farming on 61 acres. Dole described Wahiawa at the beginning of the 20th century as "a park-like stretch of some 1,400 acres of third-class pasture land, dotted with shacks of 13 hopeful homesteaders for whom [the] general sentiment was merely pity" (in Nedbalek 1984: 26). Dole founded Hawaiian Pineapple Company in 1901. Within a few years pineapple production at Wahiawa had so increased that Dole planned a cannery at Iwilei, near the shipping facilities of Honolulu Harbor. In order to transport the pineapple from Wahiawa to Honolulu, Dole persuaded the Oahu Railway & Land Company to extend its rail line to Wahiawa. The line to Wahiawa was constructed in 1906.

A 1922 map of O'ahu (based on surveys from 1908-1913) shows Wahiawa and the proposed water line route in the years following the developments detailed above (Figure 6). The plateau on the future Whitmore Village side of Kaukonahua Stream — the northeast end of the proposed route — is indicated to be planted in pineapple. On the opposite side of the stream — the southwest end the proposed route — Wahiawa Town is taking shape in the grid of streets now forming across the former homestead tracts. Schofield Barracks is fully established and rail lines course through the pineapple fields and out of Wahiawa to Honolulu.

Another feature indicated on the map is a body of water at the confluence of the north and south forks of Kaukonahua Stream. The stream was no longer a free-flowing water course after the first decade of the 20th century. Castle and Cooke had started the Wailua Agricultural Company, later known as Waialua Sugar Company, in 1889. Water was crucial to the plantation's survival and growth:

> The key to Waialua's irrigation was Wahiawa Dam and Reservoir. The 2.5-billion-gallon capacity reservoir was completed in two years, on 23 January 1906. It was the largest reservoir in Hawaii and the most economical as well. Later known as Lake Wilson, it provided 90 percent of Waialua Sugar Company's surface water...
>
> The dam itself, at 136 feet, is the highest earthen dam in Hawaii. Sited at the 1000 foot elevation, it measures 461 feet long and is 580 feet thick at the base. It created a 7-mile-long reservoir that took advantage of the natural stream beds and canyons located in the Kaukonahua gulch. (Wilcox 1996: 109-110)

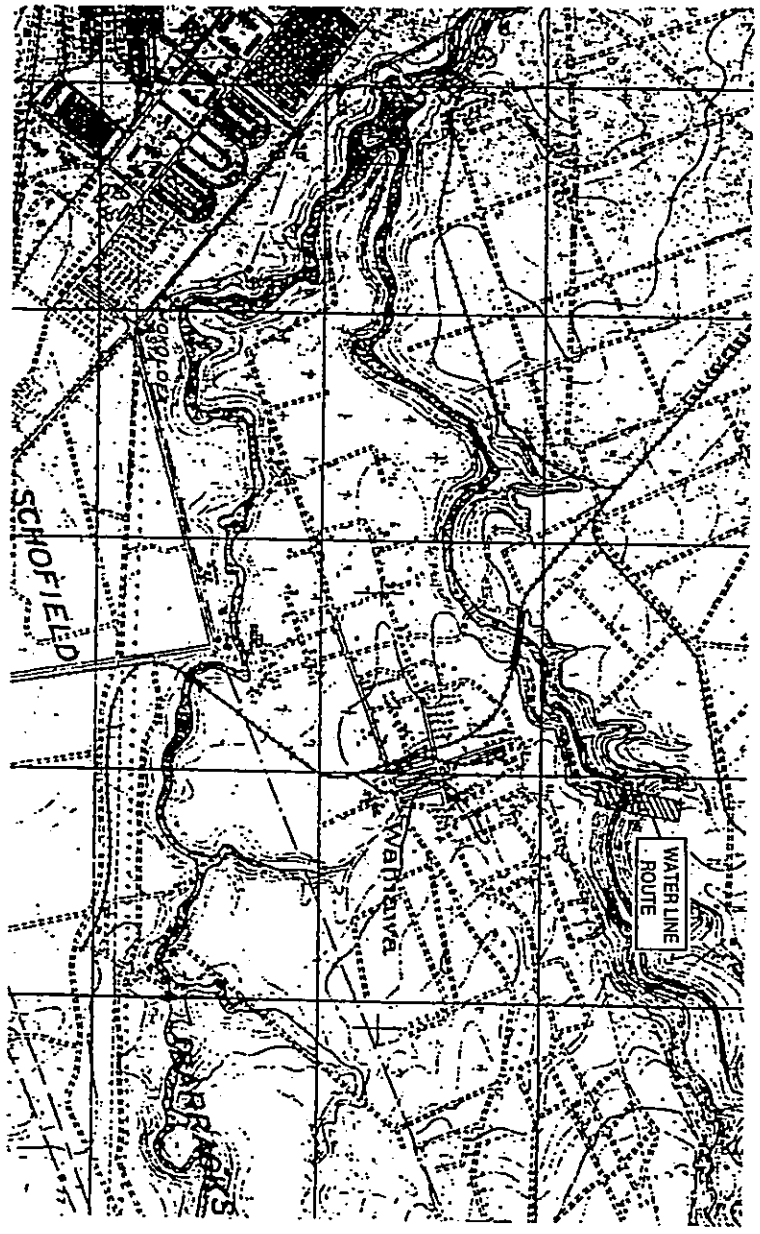

Figure 6 Portion of 1922 fire control map of O'ahu showing Wahiawa Town, Schofield Barracks and Wahiawa Reservoir — with proposed water line route indicated (hatched)

The Wahiawa Reservoir continues at present to aid in flood control and the storage of storm water.

D. Mid-20th Century to Present

Whitmore Village was created following the end of World War II:

> ...in 1947, Hawaiian Pineapple Company set out to consolidate its outlying camps by designing plans for Whitmore Village, to be constructed just north of Wahiawa. Transportation problems no longer existed, and workers could not ride in trucks to distant fields. The project encompassed seventy-seven acres and included 120 dwelling units, a playground, and a community center. Hawaiian Pineapple built some of the houses from the ground up and brought in others from the camps being closed. (Nedbalek 1984: 85)

With the establishment of Whitmore Village, all three sections of the present proposed water line route — the two plateaus and Kaukonahua Stream — were completely reshaped by the mid-20th century.

IV. PREVIOUS ARCHAEOLOGICAL STUDIES

Two archaeological sites in the general vicinity of the present study area were recorded during the first attempt at a comprehensive survey of sites on the island of O'ahu which was accomplished by J. Gilbert McAllister of the Bishop Museum in 1930. Site 218 is Kukaniloko which, as noted in the previous section, was "one of the two famous places in the Hawaiian islands for the birth of children of tapu chiefs" (McAllister 1933: 134). McAllister describes the site as it appeared in the early 1930s:

> There is now little to see at Kukaniloko. It is an inclosed area about one-half acre in size, with many large stones, some just visible, others protruding to a height of 3 to 4 feet, scattered about on a well-kept lawn. Tall trees border the site. To the old Hawaiians these stones were all named and represented alii, but now the only name remembered is Kahamaluihi, a flat stone near the center of the group. The old Hawaiians of today remember that in their childhood they were never allowed by their parents to approach even near the sacred birthplace, an indication of the great respect in which Kukaniloko was held, even a century after contact with Europeans and more than a half century after the coming of the missionaries. (*Ibid.*: 136)

Kukaniloko is located approximately 200 meters west of the intersection of Kamehameha Highway and Whitmore Road.

McAllister recorded, adjacent to Kukaniloko, Site 219: Hoolonopahu *heiau*:

> Hoolonopahu was a heiau which functioned in connection with Kukaniloko ...Here were kept the sacred drums of Opuku and Hawea which announced the birth of an alii. Nothing now remains of the temple. The land is planted in pineapple. (*Ibid.*: 137)

The only other archaeological investigation in the vicinity of the present water line route was accomplished in 1992. Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted an inventory survey of approximately 2,000 acres (Galbraith Trust Lands) (Henry *et al.* 1992). This project area is located immediately to the west of the present water line route.

During the survey, the Kukaniloko birthstones (State Inventory of Historic Places Site 50-80-04-218) were relocated and a stacked stone wall (SIHP Site 50-80-04-218) was recorded. Twelve shovel test units were excavated; no subsurface cultural deposits were encountered.

Especially relevant to the present water line route assessment, the PHRI project area included the Wahiawa Reservoir banks/ Kaukonahua Stream Gulch immediately west of the water line route. No archaeological sites were observed on the banks of the reservoir. There was ample evidence of modern human incursion into this area:

> ...large amounts of historic trash were documented along the project boundaries. Most of the trash is on the banks of Wahiawa Reservoir, Kaukonahua Stream Gulch and Poamoho Stream Gulch. The trash includes at least 30 abandoned automobiles, a wooden boat, stoves, refrigerators, beds couches, 50-gallon drums, and assorted aluminum cans, glass bottles, plastic, tires, and corrugated metal roofing. Numerous former campsites were also documented along the banks of Wahiawa Reservoir and Poamoho Stream Gulch. (Henry *et al.* 1992: 26)

V. FIELD INSPECTION

Field inspection of the proposed water line route was accomplished on May 7, 2000. A 10-meter wide area along the proposed route was inspected on foot by one archaeologist. Findings were documented by field notes and photographs (Figures 7-12).

Both ends of the route are asphalt-paved roadways through residential areas. On the Wahiawa Town side, the route runs north to the end of Clark Street where it follows an existing dirt road to the top of a steep slope down to the Wahiawa Reservoir. On the Whitmore Village side, the route descends a similarly-steep slope immediately beyond Uwalu Circle where vegetable and flower gardens have been planted. Thick vegetation on both sides of the Wahiawa Reservoir gulch included bamboo, banana trees, and various ferns and grasses.

No surface archaeological sites were observed on any portion of the water line route during the field inspection for the present assessment. The slopes down to the reservoir are steep — as indicated on the route plans and profiles included above (Figures 3 & 4) and have been heavily impacted by human intrusion — as evidenced by modern trash. No evidences of traditional Hawaiian activity were observed on the grassy bank of the reservoir. It is likely that the rising waters of the reservoir would have destroyed any traditional Hawaiian terracing or features associated with the former free-flowing Kaukonahua Stream in this area.

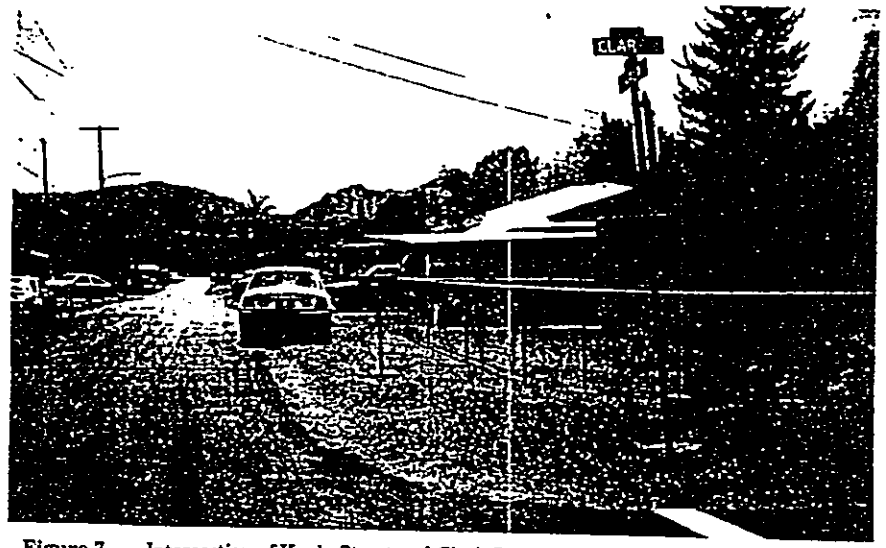

Figure 7 Intersection of Kaala Street and Clark Street, view west

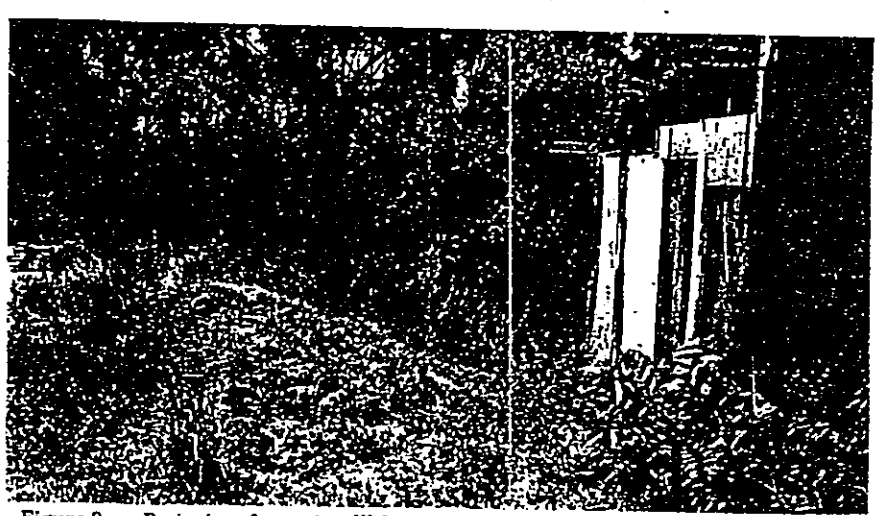

Figure 8 Beginning of route into Wahiawa Reservoir gulch at end of Clark Street, view north

Figure 9 Vegetation along water line route on Wahiawa Town side of Wahiawa Reservoir gulch, view northwest

Figure 10 Vegetation on slope on Whitmore Village side of water line route, view south

Figure 11 Typical garden on Uwalu Street at edge of plateau above Wahiawa Reservoir gulch; gulch descends immediately beyond edge of garden; view south

Figure 12 Intersection of Circle Makai Street and Nani Ihi Avenue in Whitmore Village; view southwest

VI. SUMMARY AND RECOMMENDATIONS

Summary

Historic documentation suggests that the Wahiawa area was highly significant in traditional Hawaiian times. It was associated with the Hawaiian royalty and is the location of Kukaniloko, a birthing site considered one of the most sacred places on O'ahu. Researchers have also noted the presence of extensive agricultural terraces in the area which could have supported a substantial population in pre-contact O'ahu. A large Hawaiian village continued to exist in Wahiawa at least up to the mid-19th century.

Toward the end of the 19th century, western entrepreneurial, agricultural and military interests began to focus on Wahiawa. These interests would have direct impacts upon all portions of the proposed water line route.

Kaukonahua Stream — which the water line route crosses — is no longer a free-flowing water course. It was dammed in 1906 to provide water for the Waialua Sugar Company and is now the Wahiawa Reservoir. The rising waters of the reservoir would have destroyed any traditional Hawaiian terracing or features associated with the stream.

The plateaus at both ends of the route have been subject to almost a century of agricultural and urban development. The Whitmore Village end of the route was planted in pineapple during the first decades of the 20th century and Whitmore Village itself dates to the 1940s, when it was created for plantation housing. The Wahiawa end of the route was developed as homestead lots in the late 1890s. These homesteads became the basis for the subsequent development of the present Wahiawa Town.

A 1992 archaeological inventory survey of an approximately 2,000-acre parcel adjacent to — and west of — the proposed water line route documented only one previously-unrecorded site: a stacked stone wall. The survey encountered no archaeological materials within the Wahiawa Reservoir-Kaukonahua Stream gulch.

No surface archaeological sites were observed on any portion of the water line route during the field inspection for the present assessment. Both ends of the route follow paved roads in residential areas. The slopes down to the reservoir are steep and have been heavily impacted by human intrusion — as evidenced by modern trash. No evidences of traditional Hawaiian activity were observed on the grassy bank of the reservoir.

Recommendations

Given the century-long history of modern development of all portions of the proposed water line route, the general absence of findings in the adjacent archaeological study area, and the results of the field inspection, there is little likelihood of encountering prehistoric or significant post-contact surface structures or subsurface archaeological remains during construction of the water line.

No further archaeological investigation — or archaeological monitoring during construction activities — is recommended. However, in the unlikely event that inadvertent discoveries of human remains or other cultural deposits are made during construction for the project, work should be halted in that immediate area and the State Historic Preservation Division (SHPD) should be notified.

VII. REFERENCES

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